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This month's AIA Convention in Philadelphia has provided Tony Palladino with a theme for his cover.

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GAZETTE

Polytechnic Institute of Brooklyn announced the appointment of Dr. Nathan Marcuvitz as Vice-President for Research. Dr. Marcuvitz has been director of Polytechnic's Microwave Research Institute since 1957, as well as supervisor of its electrophysics group since 1952. He has also been for the last 12 years, electrophysics consultant to NYU's Institute of Mathematical Sciences.

Richard T. Baum, partner in the firm of Jaros, Baum and Bolles, was elected President of the New York Association of Consulting Engineers. Elected Vice Presidents were Sigmund Roos, head of his own firm and Daniel T. Webster, Jr., of Seelye Stevenson, Value & Knecht. Raymond J. Rice, head of his own firm, was elected Secretary and Henry Hofeldt of Weiskopf and Pickworth was elected Treasurer.

Martin L. Bartling, Jr., immediate Past President of the National Association of Home Builders, has been appointed Assistant to the President, United States Gypsum Co.

James P. Meade has been re-elected Chairman of the Board of the Cook County Housing Authority. Others re-elected to serve as officers of the Authority are Winfield M. Sherman, Vice Chairman and Marion L. Smith, Treasurer.

John T. Rettaliata, President of the Illinois Institute of Technology, has been named by the Chicago Chapter of the Illinois Society of Professional Engineers as the "Outstanding Engineer of 1960" in the Chicago area.

The Standards Engineers Society announces the installation of its 1961 officers: President, Harold R. Terhune; Vice President, Kenneth W. Truhn; Secretary, Robert F. Franciose; Treasurer, Everett Woerter.

E. Todd Wheeler, FAIA, of Perkins and Will, Architects of Chicago and White Plains, N.Y., has accepted the national Chairmanship of the Architects and Engineers Division of the National Fund for Medical Education.

Don Rummery, RIBA, has been appointed Staff Architect, USA, for British Overseas Airways Corp. BOAC presently has 18 district sales offices and plans to add 13 new offices during the year. Mr. Rummery was appointed Senior Staff Architect for BOAC in 1958. He has worked on various projects in South America, on the eastern and southern BOAC routes, and in the United Kingdom, including the new long haul terminal at London Airport.

Lester H. Maxon, AIA, until recently a senior partner in the firm of Maxon-Sells of New York City died on March 16. He was 57 years old and lived at 390 West End Ave., New York City.



The American Hot Dip
Galvanizers Association
with the cooperation of
The American Zinc Institute
Announces the \$10,000.

Galvanizers' International

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Architectural & Engineering News

\$1,000.



Ten awards are to be made to entrants selected by the judges. Each award will consist of \$1,000 in cash, a suitable medal and a Certificate of Achievement.

This is not a contest—it is a search for new ideas. ■ Your entry, therefore, will not be judged against others, but solely on its merit and value in developing new applications and markets for Hot Dip Galvanizing. ■ If your idea, in the opinion of the judges, is of practical value to the industry, you will be cited for an award—promptly. ■ Because the Hot Dip Galvanizing Industry is anxious to receive ideas of this type, the judges reserve the right to present more than 10 awards, if the entries warrant.

CONDITIONS ■ Anyone in the world (except members of the American Hot Dip Galvanizers Association and the American Zinc Institute, and their employees and advertising agencies) may submit one or more entries. ■ Entries will be considered by the judges promptly upon their receipt. No entry received after April 30, 1962 will be considered. ■ The Awards will be made for ideas pertaining to: (a) Applications of Hot Dip Galvanizing to a *new or unusual* field, or; (b) An *improvement* in application in fields where Hot Dip Galvanizing is now being used, or; (c) New methods of *after-treatments* of Hot Dip Galvanized products. ■ Each entry submitted must contain: (a) Description and documentation of application. (b) Case history of the application or process accompanied by photo, drawings, formulae, etc. (c) All technical data needed for the utilization of the idea submitted. (d) Release of the application or idea for general use without payment or royalty other than the \$1000 award. ■ The decision of the judges will be final. Award-winning ideas will be retained by the American Hot Dip Galvanizers Association for dissemination throughout industry. Other entries will be returned. ■ No formal entry blank is required but the entry should be accompanied by the name, address and business connection of the individual submitting it. Business firms or corporations may submit entries under their business name, instead of as individuals, if they choose to do so. ■ Entries should be sent to: AMERICAN HOT DIP GALVANIZERS ASSOCIATION, INC., 5225 Manning Place, N.W., Washington 16, D. C. ■ *Note:* For information on galvanizing write to the above address for name and location of the American Hot Dip Galvanizers Association member nearest you.

THE JUDGES ■ Dr. Clarence H. Lorig, Technical Director, Battelle Memorial Institute and Past President American Society for Metals. ■ Mr. John R. Daesen, Technical Director, American Hot Dip Galvanizers Association. ■ Mr. John L. Kimberley, Executive Vice President, American Zinc Institute.

FOR ACHIEVEMENTS
IN RESEARCH,
DEVELOPMENT AND
UTILIZATION OF
GALVANIZED PRODUCTS

GAZETTE

Welton Becket, FAIA, has been elected as a member of the Board of Consultants of The Eno Foundation, a national organization devoted to study and research for highway traffic and parking improvement.

Lewis H. Tuthill, Sacramento, Calif., is the new president of the 10,300-member American Concrete Institute. Mr. Tuthill's election was announced at the recent convention in St. Louis as was the election as vice president of Roger H. Corbetta, New York, and Arthur R. Anderson, G. E. Burnett, Chester P. Siess, and Anton Tedesko as new members of the ACI Board of Direction. Mr. Tuthill, concrete engineer with the Division of Design and Construction, California State Department of Water Resources, succeeds Prof. Joe W. Kelly, University of California, Berkeley.

The appointment of Dr. Richard Franklin Humphreys as President of The Cooper Union for the Advancement of Science and Art in New York City has been announced by Irving S. Olds, chairman of the Cooper Union trustees. A leading scientist in the nuclear field, Dr. Humphreys is now Vice President of Armour Research Foundation of the Illinois Institute of Technology, Chicago.

office announcements

The firm of Allan & Olsson, Architects of Phoenix, Ariz., have established a branch office at Suite No. 1, Union Building, 112 West Gurlev, Prescott, Ariz.

Fred S. Dubin Associates, Consulting Engineers, announces that it will be represented in Philadelphia at 138 South 20th Street. The firm presently has offices in Hartford, New York, Boston, St. Louis, Puerto Rico and the Virgin Islands.

Nicholson, Rothbaum & Davis of Philadelphia announce the retirement of Horame B. Nicholson as a partner in the firm. The firm will continue its services under the name of Rothbaum & Davis, Consulting Structural Engineers.

Hammond, Quinlan and Fowler, Inc. is the new name of the Detroit firm of architects and engineers formerly known as Malcomson, Fowler & Hammond, Inc.

Edward D. Stone, FAIA, has named as his assistant William Baily Smith, AIA, of the Baton Rouge, La., architectural and engineering firm of Bodman & Murrell & Smith.

The appointment of Mary J. Healey as Design Coordinator for Freidin-Studley Associates, New York architectural, design and planning firm, was announced by Sanford Kaufman, Director of Planning. Miss Healey, former interior designer with Victor Gruen Associates, specializes in hotel, store, restaurant and lobby design.

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For a distinctive horizontal treatment, try new Masonite "X"-Siding as depicted on the side wall in the sketch. Wide exposure; exceptionally smooth, defect-free surface, and a strong shadowline combine to provide an exceedingly rich effect.

There are other sidings in the Masonite line of exterior products which you may prefer. Regardless of architectural design, you are assured of obtaining lasting beauty. Masonite sidings never split, check or crack. Test their remarkable dent-resistance yourself with a hammer.



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FORECAST

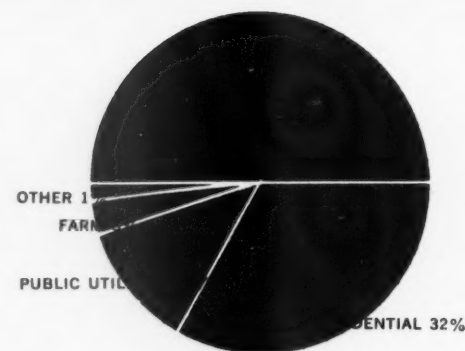
While total new *private* construction expenditures in February 1961 amounted to 5 per cent less than those of the month before, compared to a normal seasonal decline of only 4 per cent, corresponding figures for *public* construction for February reveal a decline of only 7 per cent, compared with a normal seasonal decline of 8 per cent. Private construction expenditures amounted to \$2.6 billion, down 6 per cent from February 1960. Public construction expenditures for February were \$1.0 billion, or 13 per cent higher than those for the corresponding month in 1960.

In the private sector, compared with an average decline of 5 per cent from January figures, residential non-farm construction, forming about half of all private construction, showed a decrease of 8 per cent, whereas non-residential construction (including industrial, commercial, religious, educational, institutional and recreational) and forming about one third of total private construction, showed a decline from January of only 3 per cent. However, it must be borne in mind that residential construction is affected to a greater extent by seasonal factors than is non-residential. Farm construction, constituting less than 3 per cent of private construction, showed an increase of one per cent over the preceding month. Utilities spent \$364 million, or about the same as in January.

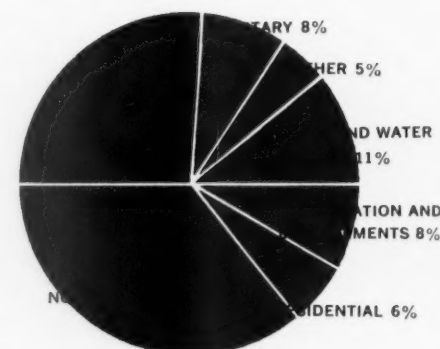
In the public sector, residential construction declined only 2 per cent compared to 7 per cent for the whole sector. However, public residential construction accounted for less than 6 per cent of the one billion dollar public total. Non-residential buildings, accounting for a little over a third of this amount, showed a decrease of 8 per cent from January, or one per cent more than the average for the month. Military facilities, highways, sewer and water systems, public service enterprises, conservation and development, and "all other public" expenditures forming the remainder of the public sector, showed decreases respectively of 17, 2, 5, 15, 11, and 5 per cent. The larger percentages reflect what are actually large dollar changes on small outlays.

February was too early to measure the impact of President Kennedy's anti-recession policy of speeding up public construction. The Post Office Department, for example, intends to spend \$270 million between March and next January, an amount ordinarily scheduled to be spread over 18 months. This amount is to be spent partly from Federal appropriations for modernization of existing Federally owned post office buildings, and partly by private investors for new buildings to be leased by the Department. Expenditures for highways, military installations and conservation are also expected to rise.

Figures released by the American Institute of Steel Construction, representing the structural steel fabricating industry, showed new orders for January to have reached 272,000 tons, or 22 per cent more than the month before and 23 per cent more than in January a year ago. James M. Straub, president of the Institute, hoped that this marked the beginning of a continuous upward swing. He called the upturn encouraging because the increased bookings reflected numerous small and medium sized contracts, rather than any two or three huge projects. He added that the rise was reflected in virtually all regions of the country. In line with Administration policies, struc-



PRIVATE CONSTRUCTION PUT IN PLACE, FEBRUARY 1961 PER CENT DISTRIBUTION



PUBLIC CONSTRUCTION PUT IN PLACE, FEBRUARY 1961 PER CENT DISTRIBUTION

NEW CONSTRUCTION PUT IN PLACE
1960-1961 COMPARISON (In Millions of Dollars)

PRIVATE CONSTRUCTION, FIRST TWO MONTHS			
1961		5,309	
1960		5,607	-5%
PUBLIC CONSTRUCTION, FIRST TWO MONTHS			
1961		2,074	
1960		1,827	+14%
TOTAL CONSTRUCTION, FIRST TWO MONTHS			
1961		7,383	
1960		7,434	-1%

tural steel tonnage for public buildings is expected to rise in 1961. In the commercial building market, Mr. Straub anticipated an increase of at least 6 per cent over 1960. The encouraging picture in steel for construction was not matched, as of the beginning of March, by a corresponding increase in demand by automobile manufacturers, who normally consume a larger proportion of total production than does the construction industry. Total tonnage of ingots and castings produced in the first two months of 1961 was down 44.6 per cent from the corresponding period in 1960, and amounted to just under 12 million net tons. Percentages relating steel production to capacity are no longer being issued.

A report on the state of the economy, released last month by the President's Council of Economic Advisers, was not encouraging as regards the immediate future, but foresaw possibility of an upturn later in the year. The gap between possible and actual production was said to have reached 8 per cent by the end of last year, and is approaching the 10 per cent figure developed at the worst stage of the 1958 recession. In terms of dollars, this represents a "slack" of some \$50 billion in economic activity.

Total construction activity based on put-in-place construction for February 1961 amounted to \$3.6 billion, down 6 per cent from the previous month. Normal seasonal decline from January to February has been 5 per cent. Spending for new construction for February 1961 was down one per cent when compared with the same period in 1960. Cumulative figures for the first two months of this year showed expenditures of \$7.38 billion, compared with \$7.43 billion spent in the comparable period of 1960. Comparative estimates for the same two month periods show: private construction expenditures declined 5 per cent, from \$5.6 billion in the first two months of 1960 to \$5.3 billion in 1961; public construction expenditures increased by 14 per cent, from \$1.8 billion in 1960 to \$2.1 billion in 1961.

These put-in-place construction figures are not based on direct measurements, except when special surveys are taken. They are derived primarily by applying standard progress patterns to the value of contracts awarded prior to the current month. These progress patterns reflect normal seasonal movements. In the case of new private dwelling units, the patterns are applied to the estimated value of housing starts prior to and including the current month. The estimates do not reflect varying number of working days in any given month, nor the following special conditions likely to influence the volume of activity: unusual weather affecting earthwork, concrete pouring, delivery of materials and the like; overtime; postponements; material shortages and work stoppages. When the last two reach serious proportions, special surveys are usually made and applied to these figures.

Projection of figures for January and February 1961 over the entire year, taking into account adjustments because of season, indicate put-in-place expenditures of \$54.433 billion for 1961.

Based on report from American Institute of Steel Construction, report from American Iron and Steel Institute, "Construction Reports" issued by U.S. Department of Commerce, Washington, D.C., and "Summary and conclusion" section of report by the President's Council of Economic Advisers as submitted to the Joint Congressional Economic Committee.

The use of membrane vapor barriers

WITH SPECIAL REGARD TO RESILIENT FLOORS

Excessive amounts of ground moisture can create problems for on- and below-grade areas of commercial and residential buildings. They vary from merely slight, but unpleasant, dampness to actual structural damage. There are engineering and architectural principles which can be applied to minimize these problems, but they are not always brought into use. Even when they are, moisture in a concrete slab is a variable, dependent upon weather changes, and the relative humidity of the slab usually approximates 100% of the dampness in the subsoil. What may be a relatively dry slab at one time can be quite different at another.

Armstrong Cork Company has given considerable attention to concrete slab construction because of its direct effect on the behavior of resilient flooring installations. In the course of these studies, certain basic information has come to light which may be generally useful to specifiers—specifically useful in connection with selection of resilient flooring.

Exterior procedures to inhibit moisture

For the most part, problems of excessive moisture are not encountered when proper precautions are taken outside the structure. Appropriate drainage systems will usually minimize, if not eliminate, the effects of local weather conditions, terrain, water-table levels, and soil types. They are beyond the scope of this article; certainly an area in which architects, engineers, and building contractors are experienced and skilled.

Moisture barriers recommended for dry interiors

In certain parts of the country, notably Florida and the Gulf Coast area, problems of excessive ground moisture are the rule, rather than the exception. And in some areas, problems are encountered due to saline solutions seeping through the concrete and harming, among other things, resilient floors or the bond of the adhesive used to install these floors. Regardless of the area, Armstrong strongly recommends the inclusion of membrane vapor barriers which, if properly installed, will effectively lower the moisture content of the slab and materially enhance the comfort and livability of the area above the slab.

Obviously, where remodelling is involved, the installation of a membrane cannot, in most cases, be considered. However, Armstrong does have a variety of flooring materials* which are suitable for on- and below-grade installation even though a membrane cannot be installed. These materials will normally perform satisfactorily, but since they are not in themselves moisture barriers, they cannot be expected to prevent the transmission of ground moisture into living areas.

Armstrong feels that the use of membrane moisture barriers is advisable because it moves the dividing line between dampness and dryness four inches or more below the flooring material rather than directly beneath it.

Types of membranes

There are currently available three basic types of membrane vapor barriers that the Armstrong installation experts consider to be safe and commendable for use with resilient floors. These are plastic (the most generally used type being polyethylene in .004 and .006 gauges), butyl rubber, and 55-pound asphalt roofing paper. All three types are effective. None offer outstanding advantages over the others. Polyethylene, for instance, is the least expensive, comes as wide as thirty-two feet, but punctures quite easily. Butyl, the most rugged and long lasting, is also the most expensive. Layers of asphalt roofing paper sealed with hot tar provide a good barrier, but such a barrier doesn't last so long as the other types.

The barrier above, within, or below the slab?

Membrane vapor barriers installed directly on the top of the slab do not provide the stable surface needed for a satisfactory resilient floor installation. Therefore, the barrier must either be laid below the slab before it is poured, or within it, sandwiched between two layers of concrete. (While this "sandwich" method provides a number of advantages as far as wear and preventing damage go, it is more costly—and seldom used at present.) Whenever a membrane vapor barrier is put in with concrete below grade, it is important that it also be flashed vertically up the foundation wall to above the line where the resilient floor will be laid. This will stop moisture from seeping sideways through the walls to the finished floor. Providing that the membrane is intact, untorn, thoroughly sealed, and that there is no leakage around ducts, pipes, or pilings, it will provide good protection against moisture for resilient floors used on and below grade. It is vital that the condition of the barrier and its installation be thoroughly checked just before it is covered.

Special services for architects

If you have questions to do with vapor barriers—or about resilient floors in general—call the Architectural-Builder Consultant at your Armstrong District Office. A flooring expert, he is thoroughly familiar with the installation problems apt to be encountered in your area. If additional help is required, he can get it from the Armstrong installation experts and the Armstrong Research and Development Center. Or write direct to Armstrong, 1604 Ryman Street, Lancaster, Pennsylvania.

* Specifically, these floors are: Asphalt Tile, Excelon vinyl-asbestos Tile, Rubber Tile, Custom Corlon, Castilian Solid Vinyl Tile, and Sheet Vinyl Corlon with Hydrocord Back.

Armstrong
CORK COMPANY

FLOOR DIVISION • LANCASTER, PENNSYLVANIA

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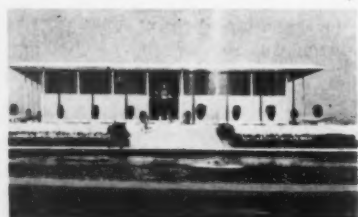
A/E NEWS



ABOVE. Le Corbusier, winner of the 1961 AIA Gold Medal.
BELOW AND RIGHT. The 1961 AIA Honor Award winners. (1) United States Embassy, New Delhi, India: Edward D. Stone; (2) Shrine, New Harmony, Ind.: Philip Johnson; (3) Nuclear Reactor, Rehovot, Israel: Philip Johnson; (4) Summer House, Northville, Mich.: Birkerts and Straub; (5) Reynolds Metals Regional Sales Office Building, Detroit: Minoru Yamasaki; (6) Fernando Rivera Elementary School, Daly City, Calif.: Mario J. Ciampi and Paul Reiter; (7) Pepsi Cola World Headquarters in New York: Skidmore, Owings and Merrill.



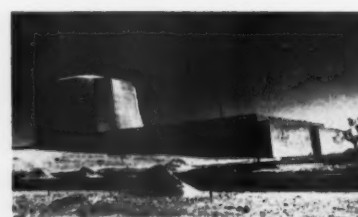
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Charles-Edouard Jeanneret (Le Corbusier), elected winner of the 1961 AIA Gold Medal, has been invited to attend the AIA national convention in Philadelphia, April 25 to 28, to receive the honor in person. Born in 1887 at La Chaux-de-Fonds, Switzerland, his career as architect, planner, painter, sculptor and writer spans nearly fifty years, beginning in the studios of Auguste Perret in Paris and Peter Behrens in Berlin.

His first book, "Towards a New Architecture," was published in 1923. His plans for buildings that were never realized, such as the League of Nations Palace in Geneva (1927), achieved as much fame as those that were. These include the Ministry of Light Industries in Moscow (1929 to 1935) and the Swiss Pavilion at Cité Universitaire in Paris (1932). Both still stand. In 1938 Le Corbusier went to Brazil and, with Oscar Niemeyer and others, took part in designing the Ministry of Education Building in Rio de Janeiro. It was completed in 1943.

Le Corbusier visited the United States in 1935 to lecture here, and later served as French representative on the UN Headquarters Commission after World War II. He took part in the early design stages of the United Nations headquarters in New York. His most recent work includes the Marseilles apartment block (1952) and the Notre Dame du Haut Chapel at Ronchamp (1955). His largest project, started in 1951, is the complete planning and design of Chandigarh, capital of the Punjab, in India. First completed public building is the Palace of Justice, which makes a dramatic use of reinforced concrete.

Other pioneers of modern architecture who have received the AIA Gold Medal are Frank Lloyd Wright (1949), Walter Gropius (1959) and Ludwig Mies van der Rohe (1960).

A jury of outstanding architects has selected seven recently completed buildings for the annual Honor Awards of *The American Institute of Architects*. These buildings, the jury said, "went far beyond mere competence and achieved true significance."

The 1961 AIA Honor Award winners are: United States Embassy in New Delhi, India, by Architect Edward D. Stone of New York; the Shrine in New Harmony, Indiana and

the Nuclear Reactor in Rehovot, Israel, both by Philip Johnson of New York; Summer House in Northville, Mich. by Birkerts and Straub of Birmingham, Mich.; the Reynolds Metals Regional Sales Office Building in Detroit by Minoru Yamasaki of Birmingham, Mich.; Fernando Rivera Elementary School, Daly City, Calif. by Mario J. Ciampi and Paul Reiter as Associated Architect of San Francisco, Calif.; and the Pepsi-Cola World Headquarters in New York by Skidmore Owings & Merrill of New York. (See photos, p. 6.)

Established in 1949 to encourage the appreciation of excellence in architecture and to afford recognition of exceptional merit in recently completed buildings, the AIA Honor Awards Program is open to any registered architect practicing professionally in the United States. Buildings entered, which may be anywhere in the U.S. or abroad, must have been completed within the past five years.

AIA portfolio

The American Institute of Architects will advance 46 of its members to the rank of Fellow at the society's annual convention in Philadelphia, April 24-28. This honor is bestowed for distinguished performance in architectural design, education, science of construction, public service or service to the AIA. The names of the newly elected Fellows were announced by AIA President Philip Will, Jr., FAIA. Selection was made by the Jury of Fellows comprised of George Bain Cummings, FAIA, Chairman; Nelson Smith, FAIA; J. Woolson Brooks, FAIA; Richard M. Bennett, FAIA; George Allison, FAIA; R. Max Brooks, FAIA. A complete list of the 1961 Class of Fellows, together with chapter affiliation and distinction of each, follows.

Richard L. Aeck, Georgia, Design; Arthur T. Brown, Southern Arizona, Design; Franklin S. Bunch, Jacksonville, Service to The Institute and Public Service; Richard D. Butterfield, Connecticut, Design; Archangelo Cascieri, Massachusetts, Education; Bartlett Cocke, San Antonio, Service to The Institute; Cornelius M. Deasy, Southern California, Service to The Institute; Thomas F. Ellerbe, St. Paul, Design; Donn Emmons, Northern California, Design and Service to The Institute.

Carney Goldberg, Massachusetts, Design; Bernard J. Grad, New Jersey,

(Continued on page 8)

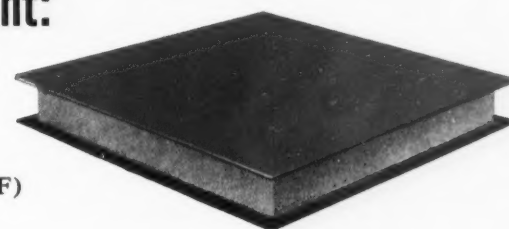
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Kings College Science Building, Wilkes-Barre, Pennsylvania. Designed by Lacey, Atherton and Davis. Construction features urethane foam core panels with porcelain exterior on stainless steel grid.

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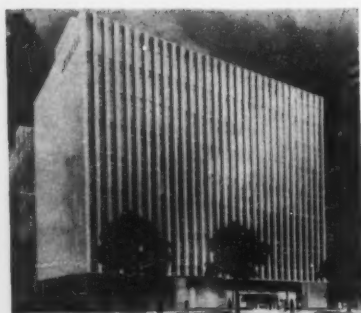


1-30

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"We expect these diffusers
cast of Du Pont MONOCITE*
to keep their beauty
for the life of the fixtures"



The Deering Milliken Building, 1045 Sixth Ave., New York City. Architects: Carson & Lundin, New York City. Fixture manufacturer: The Frink Corp., Brooklyn, N. Y. Installation: Eastern States Electrical Contractors, Inc., New York, N.Y.

Lighting shield panels made by
THE POLYCAST CORP.
Stamford, Conn.

POLYCHEMICALS DEPARTMENT



Better Things for Better Living . . . through Chemistry

Says Roy Duncan, superintendent of New York's new Deering Milliken Building. "The assignment was to get the 'most exciting ceiling in New York' for our first three floors. So the architects designed the checkerboard layout and specified diffusers that are cast from Du Pont MONOCITE.

"These panels were selected because they diffuse the light perfectly, maintaining maximum efficiency for years. They disguise the presence of fluorescent tubes and can be used in larger areas than other types.

"Also, they're extremely durable and easily cleaned, which keeps our maintenance problems at a minimum. We expect these diffusers**, cast by The Polycast Corp. of Stamford, Conn., to last the life of the fixtures. It's obvious why we recommend them highly."

It will pay you to find out how Du Pont's customers are using Du Pont MONOCITE to produce lighting-fixture shields that will give you outstanding service with a minimum of maintenance. For more information, write: E. I. du Pont de Nemours & Co. (Inc.), Dept. AE-4, Room 2507M, Nemours Bldg., Wilmington 98, Delaware.

*Trademark for Du Pont's methacrylate monomer

**Flat Polycast acrylic sheets

A/E NEWS

(Continued from page 7)

Design; Olindo Grossi, New York, Education; Victor D. Gruen, New York, Design and Public Service; Alonzo J. Harriman, Maine, Service to The Institute; Robert F. Hastings, Detroit, Service to The Institute and Public Service; Richard J. Heidelberger, Long Island, Service to the Institute; Frederick C. Hummel, Idaho, Public Service; Edward D. James, Indiana, Service to The Institute.

Sidney L. Katz, New York, Education; John L. King, Northern California, Design and Public Service; Carl Koch, Massachusetts, Design and Science of Construction; Roland L. Linder, Colorado, Service to The Institute; John P. Macelwane, Toledo, Public Service; William Mosser, Sr., Northern California, Service to The Institute; Samuel Z. Moskowitz, Northeastern Pennsylvania, Service to The Institute; Eliot F. Noyes, Connecticut, Design; Richard W. E. Perrin, Wisconsin, Education and Public Service.

Charles E. Peterson, Philadelphia, Education and Literature; George F. Pierce, Jr., Houston, Service to The Institute; Frederic H. Porter, Sr., Wyoming, Service to The Institute; Russell S. Potter, Cincinnati, Education; Beryl Price, Philadelphia, Service to The Institute; Ladislav L. Rado, New York, Design; Eleanor Raymond, Massachusetts, Design; Edwin T. Reeder, Florida South, Public Service; Eberle M. Smith, Detroit, Design, Science of Construction and Service to The Institute.

Moreland G. Smith, Alabama, Design; Herbert H. Swinburne, Philadelphia, Service to The Institute; William B. Tabler, New York, Design; Thomas C. Vint, Washington-Metropolitan, Public Service; Joseph Waterson, Long Island, Literature; Harry M. Weese, Chicago, Design; William B. Wiener, Shreveport, Design; Leonard Wolf, Iowa, Education; Worley K. Wong, Northern California, Design; Philip N. Youtz, Detroit, Education, Literature and Science of Construction.

Prizes/awards

The 1961 R. S. Reynolds Memorial Award has been given to the project designed by Joseph D. Murphy, FAIA, and Eugene J. Mackey, AIA. This design, an aluminum and clear plastic dome, termed by its architects the

←Circle 105 for further information

Architectural & Engineering News

"Climatron," is a greenhouse containing the tropical collection of the 100-year-old Missouri Botanical Garden in St. Louis. (See photo p. 10.)

The Report of the Jury states in part: "A beautiful and refined version of one of the oldest architectural forms, this application of the Geodesic Dome principles of R. Buckminster Fuller is sensitively executed and strikingly appropriate to its purpose. The climate controlled space is contained by a lacey structural network with a minimum of obstruction of the sky. Lightly poised on five points, spanning approximately 180 feet, it is about the size of the Pantheon in Rome. The uncontrived details exploit the inherent qualities of aluminum and are well refined. Although there is a minimum feeling of enclosure from the inside, the exterior is nevertheless a clear statement of form, uncluttered by additional appurtenances. By raising the dome off the ground, a hovering quality is attained which presages the feeling of lightness experienced inside." The Jury decision was unanimous.

In the five years of the Award, this is the first conferred on an American team of architects. Previous awards have gone to architects in Spain, Belgium, Australia and Switzerland for buildings in those countries.

Jury chairman was Minoru Yamasaki, FAIA, of Birmingham, Mich. Other members were Paul Thiry, FAIA, of Seattle, Wash.; Hugh A. Stubbins, Jr., FAIA, of Cambridge, Mass.; Henrique R. Mindlin, of Rio de Janeiro, Brazil; and Samuel T. Hurst, AIA, Dean of Alabama Polytechnic Institute's School of Architecture and the Arts, Auburn, Ala.

The "Climatron" was conceived by Dr. Frits Went, director of the Missouri Botanical Garden, as its principal attraction, replacing an old greenhouse structure. This concept required it to be a dramatic botanical showcase for the public, but with closely controlled and varied climatic conditions for research purposes. The precise climatic controls suggested the building name.

Its displays form four areas, each with its own simulated geographic setting—representing the climate and vegetation of Hawaii, India, Java and the Amazon area. A special system of air-conditioning permits the varying "climates" without physical compartmentation of the areas. (See photo.)

A design by a fifth year architect-

tural student John L. Dewey of the University of Cincinnati has won the first annual \$5,000 Reynolds Aluminum Prize for Architectural Students.

The national prize will be divided equally between the University and Mr. Dewey, a 22-year-old resident of Cincinnati. Selection of the winner was announced by *The American Institute of Architects*, which administers the prize for "the best original design of a building component in aluminum." Mr. Dewey designed a "Component Structure of Aluminum" intended especially for downtown pedestrian plazas in such applications as display centers, pedestrian rest areas, information booths, or shelters at bus stops.

The Jury also singled out for unofficial honors two entries designated as "runners-up" and one for honorable mention. The runner-up designs were by Wolfgang Jabs, Stanford University, who designed an aluminum curtain, and Richard B. Norman, University of Michigan, who designed an open air radiator. The design for an aluminum roof system submitted by Anthony S. Predock of the University of New Mexico was given an honorable mention by the Jury.

Sculptor Robert Cronbach of Westbury, Long Island, has been commissioned to create the sculpture symbolizing the 1961 R. S. Reynolds Memorial Award.

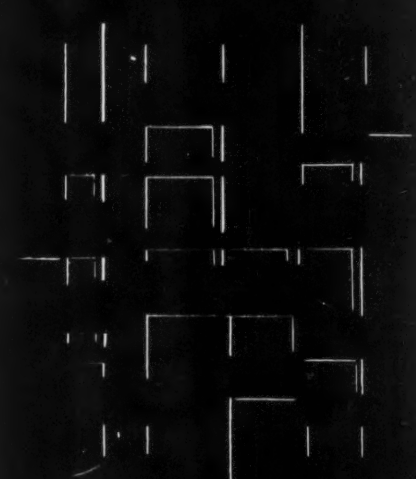
Scholarships/competitions

New York Chapter, AIA, announces the Annual House Improvement Award given by the House Consulting Committee for outstanding work in the field of remodeling or renewal of town houses in Manhattan. The purpose of the award or awards is to demonstrate *to the architect* that his effort in the renewal of our urban neighborhoods is a significant contribution; *to the public* that professional planning is necessary and that it pays to employ the services of an architect. For further information, consult the Annual House Improvement Award, House Consulting Committee, New York Chapter, AIA, 115 East 40th St., New York 16, N.Y.

Dr. John C. Baker, President of Ohio University, has announced the establishment of a scholarship in architecture to be awarded to a student selected by the Director and faculty of the School of Architecture. The new award is made possible by a grant from the office of Bellman, Gillett &

(Continued on page 10)

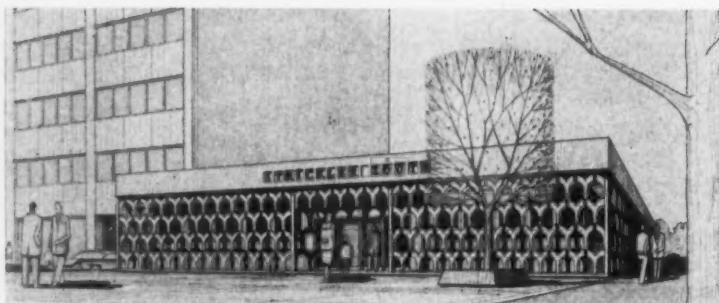
A STATEMENT OF POLICY



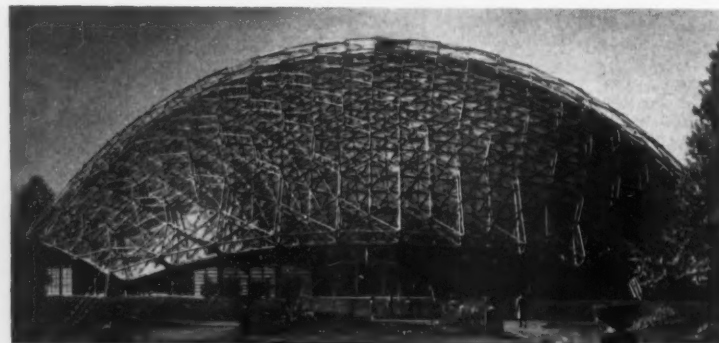
The Public Safety Building in Norfolk, Va., a \$4.5 million multi-purpose structure representing the first unit of a \$15 million Civic Center, is designed to incorporate the Police Division, the City Jail and the Municipal Courts and is reportedly the largest building of its type in the nation. Architect: Vincent G. Kling, Philadelphia, in association with Oliver and Smith of Norfolk.



The National Cowboy Hall of Fame and Western Heritage Center, Persimmon Hill, near Oklahoma City, Okla. Architects: Begrow and Brown, Birmingham, Mich.



Scheduled for completion in July is Strickler South, an addition to the Cyrus Strickler Doctors Building in Atlanta. Areas include 12,853 gross square feet of office building and 27,613 square feet of parking construction. Architects and Engineers: Toombs, Amisano and Wells, Atlanta. Mechanical and Electrical Engineers: J. E. Guerrero, Atlanta.



Exterior view of the Climatron in the Missouri Botanical Garden, winner of the 1961 R. S. Reynolds Memorial Award. Architects: Murphy and Mackey, St. Louis.

A/E NEWS

(Continued from page 9)

Richards and is known as the John Noble Richards Scholarship. The scholarship will be awarded to an outstanding and worthy student in the newly established School of Architecture at Ohio University which continues the tradition of architectural education carried on by the Department of Architecture established in 1937.

The 1961 Annual Architectural Competition, sponsored by the Mastic Tile Division of The Ruberoid Co., is concerned with the planning of adequate medical facilities for the rapidly growing suburban communities of America. The 1961 program assumes that health and hospital accommodations of the parent city have been extended and developed to a point of congestion. The regional hospital council has recommended that future efforts be directed to developing a coordinated hospital system on the general framework formulated by the United States Public Health Service. Consolidation of the community clinic with the rural hospital to form a suburban general hospital which, in turn, will be expanded into a larger district hospital, has been proposed.

The \$25,000 competition is open to all registered architects, architectural assistants and students of schools which are members or associate members of the Assn. of Collegiate Schools of Architecture. Registrations with complete details of the competition are available directly from the Mastic Tile Division of The Ruberoid Co., Box 128, Vails Gate, N. Y. All entries are to be in the hands of the Architectural League of New York City no later than June 30, 1961.

A panel of five Bay Area architects and builders has been named by the San Francisco Redevelopment Agency to select ten award-winning designs in the Diamond Heights, Red Rock Hill architectural competition.

The architects are Ernest J. Kump, FAIA, Palo Alto; John Carl Warnecke, AIA, San Francisco; and Don Burkholder, San Francisco Redevelopment Agency. The builders are Joseph Eichler, Palo Alto; and Gerson Bakar, San Francisco. The professional adviser to the competition is William J. Watson, AIA, San Francisco.

Entries to the competition, open to licensed architects in the United States will be judged June 13, 14, and

15, 1961. The Redevelopment Agency will pay \$1000 each for the use of the ten designs selected. The selected designs will be equally ranked without priority among such designs. Submission date is May 26, 1961. Last date for receipt of questions was April 7.

Roundup

The first section of the National Cowboy Hall of Fame and Western Heritage Center is well on the road to completion atop Persimmon Hill, near the intersection of US Highways 66 and 77 near Oklahoma City. This \$5 million national shrine will pay public tribute to the men and women who formed our Western Heritage, and will be a permanent landmark for Oklahoma. The design for the memorial to the Old West came as the result of a nation-wide, AIA-approved contest. Begrow and Brown, Birmingham, Mich., the winners, were selected as architects. (See photo.)

The first section of the center will cost \$1.5 million. It will be completed after a fund-raising drive in each of the 17 western states.

The new wing of the Museum of Modern Art will first open to the public at the time of the 1964 New York World's Fair, according to Mrs. John D. Rockefeller 3rd, Vice President of the Museum. Philip C. Johnson is the architect for the building which will be built on West 54th Street, Manhattan.

New York University plans to begin construction in August of University Village, its housing project for faculty members, married students, and persons who live or work in Greenwich Village, according to George F. Baughman, Vice President for Business Affairs and Treasurer. Mr. Baughman said that the University plans to construct three buildings on the site this year and later to add an elementary school structure. The project will have an underground parking facility that will accommodate at least 250 cars, a swimming pool, and a social center. More than 2,000 persons are expected to live there. I. M. Pei & Associates have been commissioned to design University Village. John A. Pruyn has been named architectural and planning consultant.

AIA President, Philip Will, Jr., one of three panelists at a "Round-table of Tomorrow" said this to members of the Aluminum Assn. in an address prepared for delivery at their celebration honoring aluminum's 75th anniversary: "We must think in uncon-

ventional terms . . . a successful aluminum wall system will require that every part do double or triple duty, mechanical or electrical as well as structural. I can imagine, for example, an exterior skin which would be stressed in tension, serve as the appearance surface and also, like the human skin, sweat a little to cool the building in summer. Interior surfaces can have permanent vinyl coatings, incorporate radiant heating and cooling and convenience wiring plus luminescent panels for lighting. The structure would be assembled with glue, factory applied along panel edges and temporarily protected against premature setting by removable strips of tape."

ASTM/EJC/CEC news

The *Engineers Joint Council* and the *American Society for Testing Materials* announced that the ASTM had been elected as an affiliate member of the Council. The action was taken by the Board of Directors of the Engineers Joint Council at its annual meeting.

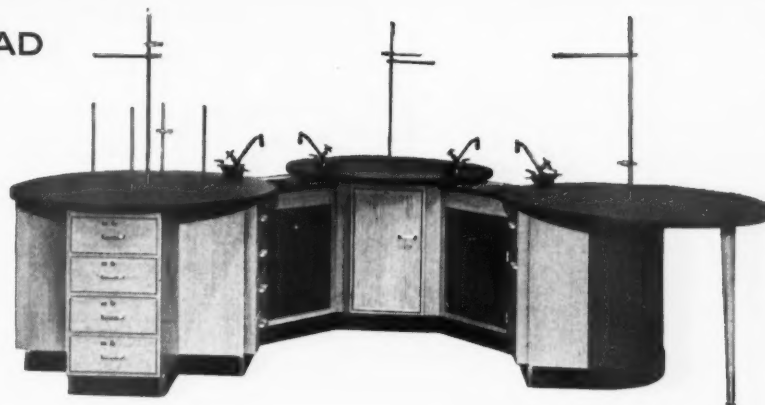
Harold P. King, prominent California consulting engineer, residing in Sherman Oaks, will be installed as President of the *Consulting Engineers Council*, at the fifth annual Board of Directors meeting, May 4-6, in the Executive House, Chicago. He succeeds Hueston M. Smith, St. Louis, Mo. The President-elect is a structural engineer and partner in the Sherman Oaks consulting firm of King, Benioff & Associates. He is currently First Vice President of CEC and since 1959 has served on the Council's Board of Directors, either as a delegate or alternate. During that period he was also chairman of CEC By-Laws Committee, in which capacity he supervised the recent redrafting of the Council's Articles of Incorporation and By-Laws to permit specifically membership by individuals as well as corporations. Mr. King, a native of Iowa, also is a Past President of the Consulting Engineers Association of California, Structural Engineers Association of California, and Structural Engineers Association of Southern California.

Other officers to be installed include Cedric Robert Acheson, Syracuse, N.Y., as First Vice President; Sanford K. Fosholt, Muscatine, Iowa, Second Vice President; George J. Toman, Mandan, N.D., Secretary; George W. Poulsen, Jr., Salt Lake City, Treasurer.

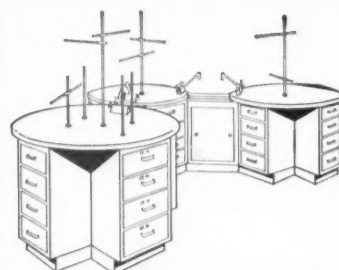
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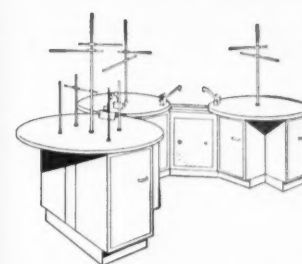
"Science Circle" Laboratory Furniture uses round tops, a choice of several storage bases, and interconnecting sinks to provide maximum work area at reasonable cost. Three types of base units are shown in this composite photo.



This eight-student arrangement for biology-physiology-general science consists of two four-student tables with one interconnecting sink. Each table has two No. 821-P base units and a standard leg unit.



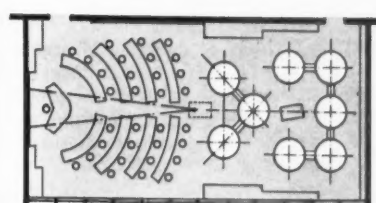
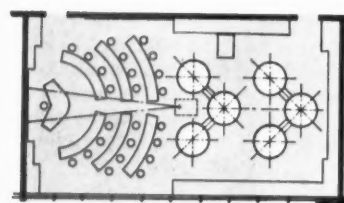
Twelve students can use this chemistry-physics arrangement of three tables in triangular arrangement. Each table has four No. 822-P base units. The two sinks each have two cold water faucets, four gas cocks, and four duplex electrical outlets. These services are standard.



This arrangement is similar to the preceding twelve-student combination but uses three No. 692 "Station Issue" base units with two sinks. Services are standard as noted before. Ring rods shown on all illustrations are optional equipment.

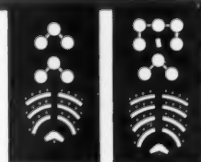


The No. 510 Instructor's Demonstration Desk is equipped with a sink, aluminum uprights and connecting rod. The desk shown has one No. 820-P base unit and one No. 822-P unit. Services include one cold and one hot water faucet, one gas cock, one duplex electrical outlet.



A wide variety of arrangements is possible with "Science Circle" Furniture. Here are two typical chemistry-physics laboratories, one equipped for twenty-four students, and the other for thirty-two students. No. 630 Amphi-Lecture students' tables and a No. 510 demonstration desk are used in the lecture area.

For details, request Bulletin No. SC560.



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TOWARDS AN EXPLORATION IN AWARENESS

by Herbert H. Swinburne, AIA*

In the face of growing dilemmas forced upon us by our rapidly rising population, the author here makes a plea for awareness of our problems as the first step towards any comprehensive solution.

I.

In a recent move, the Governors of New York, Connecticut, Rhode Island and Massachusetts, the Mayor of New York and the County Executive of Westchester County agreed to a proposal which would try to bail out the financially wobbly New York, New Haven and Hartford Railroad to the extent of nearly \$55 million.

At about the same time a suggested compact was disclosed whereby the Governors of New York, New Jersey, Pennsylvania and Delaware, together with a representative of the President, would head a commission charged with running the water resources of the Delaware River Basin on a long term basis.

A project known as the Penn-Jersey Transportation Study is at present conducting a \$3 million research program covering the Philadelphia-Camden area and comprising five counties in Pennsylvania and four in New Jersey.

These examples are raised to show how separate States are working with each other to solve their mutual, pressing problems. By 1999, when our population reaches 300 million, these problems will increase a hundredfold. We shall all be competing with each other for space, money and talent.

* Mr. Swinburne is Partner of the firm of Nolen & Swinburne of Philadelphia.

Circle 109 for further information about YOUNGSTOWN pp. 14-15 →

II.

A substantial fraction of this 300 million will be concentrated in a relatively small portion of the Middle Atlantic States area with Boston at the northern anchor and Norfolk at its south end. At 25,000 square miles it is only one quarter of the area of Colorado and only one sixth that of California; yet this area now has nearly 20 per cent of the country's population inhabiting just under 0.7 per cent of its land area. An airplane flight between some of these cities on a clear night shows what now appears as one continuous net: imagine the sprawl by 1999.

From an economic standpoint, this area controls the nation. In the fiscal year 1960, out of nearly \$92 billion of corporate, individual and miscellaneous taxes collected by the Bureau of Internal Revenue, over \$30 billion, or 33 per cent, came from this area.

Now this emphasis on population and money is no idle drawing upon statistics to prove a point. These figures serve to stress what planning is really all about. Numbers do indeed describe graphically our approaching problems as we are compressed into greater densities. But in the end it is people we are concerned with, people with goals and aspirations, whose planning cannot drift haphazardly, who will not settle for solving their problems one at a time, piece by piece. The first difficulty facing us today is to give all the factors their rightful importance; the second difficulty is to recognize the patterns of problems.

Let us look into this a little farther. We must realize that as our population grows, and as the ratio

of rural to urban population in the multi-state area becomes rapidly more lopsided, there will be no more flight to the suburbs: the suburbs will be the city too. We are running out of space. But somehow we must conserve it; we must save some of nature and blend it with our cities; we must rebuild and renew what we have; we must plan more.

Let us examine a series of unfortunate historical incidents.

Our political boundaries as they are found today no longer reflect any reasonable geo-political system. Historically, a river was used to divide one state from another, one county from the next, this city from that, because it was a convenient line of separation. Similarly a line of longitude or of latitude has served to separate political entities. This obsolete form of boundary drawing now hinders us at every step.

Recent figures from the Bureau of the Census reveal that for the first time more people live in the suburbs of New York City than live in the City itself. The suburban population is spread among sixteen counties, three states, and over one thousand assorted other jurisdictions.

Note also: at the last meeting of the Metropolitan Regional Council, its chairman, the Mayor of New York, proposed that the Council act as a coordinating body for the various agencies operating in New York, New Jersey and Connecticut. This, he said, could be done by securing from each such agency a regular management report, which would be evaluated, and then distributed to all local governments,

(Continued on page 17)



INTERESTING DESIGN+NATCO BRICK=MODERN GARAGE

Graceful, modern architectural design, plus the beauty of smooth, unglazed, buff-colored Natco face brick sets this new downtown Boston parking garage apart as one of the finest in the country.

Apart from being simply a functional structure capable of handling 734 automobiles, this 12-level garage makes an aesthetic, architecturally pleasing contribution to the City of Boston's redevelopment program.

Clear ceramic glazed Vitritile, also made by Natco, was used to face interior walls in the garage office, wash rooms, attendants' quarters and warming rooms for elevator operators. Low maintenance costs result since this structural facing tile requires only a periodic wiping to retain a clean, cool, new appearance.

The architect, Mr. S. S. Eisenberg, referring to the new parking garage stated, "We tried to provide modern design with the best materials available."



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SERVICE IN STEAM CONDENSATE RETURN LINE**

	specific pipe weight grams per lineal inch		change in specific pipe weight	
	Original Pipe	Corroded Pipe	Grams per Lin. Inch	Per Cent
Yoloy Pipe	40.3317	40.0786	-.2531	-.63%
Wrought Iron	41.3469	40.7438	.6031	1.46%

Steam condensate pH, 6.65. Pipe samples, ¾" nominal standard weight size.

**Weight loss due to atmospheric corrosion
after 3100 days exposure.**

YOLOY STEEL	OPEN HEARTH	BESSEMER STEEL
3.70 LOSS	9.38 LOSS	18.29 LOSS

**RESISTANCE TO SOIL CORROSION
13 Soils Ranging from 2.6 pH to 9.4 pH**

Time (Years)	CARBON STEEL		YOLOY		WROUGHT IRON	
	Wt. Loss*	Penetra- tion**	Wt. Loss*	Penetra- tion**	Wt. Loss*	Penetra- tion**
2	6.1	52	4.3	41	4.8	48
5.4	11.1	81	7.2	52	8.8	75
7.4	12.1	89	9.5	79	10.9	89
9.3	17.4	88	10.6	79	12.2	97
14.3	19.7	107	11.8	93	16.3	98

* Wt. Loss, oz/ft²

** Penetration—mils (Average Max.)

SEA WATER IMMERSION TEST

Material	Days In Test	Wt. Loss (Grams)	Corr. Rate		Pitting—Mils	
			Mdd	IPY	Max.	Aug.
Mild Steel	2162	1439	36	.007	Perf.	128
Hand Puddled Wrought Iron	2384	1401	32	.006	Perf.	115
Mechanically Puddled Wrought Iron	2384	1247	28	.006	139	80
Yoloy	3429	1616	25	.005	90	62

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at lower cost than wrought iron**

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The Youngstown Sheet and Tube Company, Youngstown, Ohio



Why sheet rubber flooring was selected for patient areas in Presbyterian Hospital modernization

The problem of infectious Staphylococci germs tipped the balance in favor of sheet rubber flooring in the recent modernization of Presbyterian Hospital, Charlotte, N. C.

The architects reasoned that fewer seams and cracks would mean fewer hiding places for this elusive hospital menace. To achieve an installation with a minimum of joints they specified sheet rubber flooring—tightly fitted by overlapping and double cutting—coved up the walls to normal base height.

The floors are warmly attractive, with terrazzo styling in rubber that provides an impressive overall design effect.

Sheet Rubber flooring has it for hospital patient areas—quiet comfort underfoot, easy to maintain, with unlimited design and color possibilities. And the colors go clear through—no laminations!

Two styles to choose from: Flexi-Flor in 20 marbleized colors—Tara-Flor in 12 terrazzo color combinations.

Wall-Flex (rubber wall covering) is ideal for hospital patient areas. Designed for durability and attractiveness (14 pastel mottled colors), Wall-Flex won't mar, nick or scratch. Outstanding dimensional stability, low maintenance cost and proven past performance guarantee long service and economy.



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Circle 110 for further information

16

Architectural & Engineering News

EXPLORATION IN AWARENESS (Continued from page 12)

commissions and authorities involved. Other actions at the meeting served to point out the problems threatening the region: an inventory of its water supply was proposed; the New Jersey Legislature, in the wake of similar action by that of New York, was called upon to give the Interstate Sanitary Commission coordinating power in interstate air-pollution problems; in order to keep close track of population changes, a five year interval from census to census was proposed to replace the present ten year interval; the Traffic and Transportation Committee of the Council was urged to study the implications of helicopter service, of strip radar highway systems and of the newly developed vehicle which travels on a cushion of compressed air.

It is not that governmental leaders refuse to get together. It is said that in the Philadelphia area alone there are some 500 agreements between various agencies. Only last month eight Fairfield County, Connecticut, communities formed a Southwestern Fairfield County Planning Region. At the other end of the scale, the New York Metropolitan Regional Council consists of representatives from three States, twenty-one counties and sixteen cities. But the problem is much broader than that.

The intricacies of this and other similar geopolitical monsters have invaded every sector of our existence. They have complicated the rational solution of some of our most difficult planning problems.

III.

We are concerned with geography, State borders, rivers, distances. We have compared the area under study with a "super-region" similar to California and Colorado. We are involved with square miles, percentages of population, and wealth; with population growth, the growth of cities, how they began and how they were tied to forms of transportation; how the problems have multiplied, how rivers have separated States and common problems; how this growth is now accelerating at a stupendous pace, how we are drifting towards a crisis, and how we are merely deferring it through short range planning.

I lay no claim to being the first to hold out this idea, nor am I advocating specific solutions to specific problems. I am saying that none of us knows exactly what our problems are going to be ten, twenty or thirty years from now. I am saying that we must explore. We will not solve; we will define; we will block out. We must undertake an Exploration in Awareness.

We must search for problems and give them names. We must locate them in space and in time. We must see how they affect the whole people, how they affect our economics and our politics. There are those concerned with immediate problems in specific fields, and they are trying, seriously, conscientiously to solve those particular problems. But we are concerned with all problems, how they relate and how the solution of one problem affects all the others. The sum is greater than the parts. We must avoid arriving at general principles based on pieces of the solution.

Let us then review some fields which are ripe for exploration, as we strive to keep people, space and resources in equilibrium:

- The loss of land, the loss of space. The conflicts of interests as they compete for ownership of this space.
- Emergencies are being generated by the automobile; true, but transportation crises are

touched off by more than just the automobile, and involve more than the great problem of a national, interstate and local highway net. It is a problem of *all* transportation—highways, railroads, airlines, rivers, harbors and pedestrian.

- Eminent domain and condemnation.
- Geo-political boundaries—ought they to be revised? Do we need a "super-area" of jurisdiction?
- In short—a rational investigation of present and potential problems affecting entire regions.

The need then is to define our problems: to work one out against the other, and to consider the problems as a pattern. The cardinal fact to remember is that we are not dealing merely with products and statistics, but with people—with the dignity of individuals.

We are not considering any existing political boundary except as a point of departure. The geo-politics involved in fact constitute a fundamental aspect of the problem.

There is another aspect. In our Exploration in Awareness, we must bear in mind that the architect-planner is inclined to operate within the narrowed field of his professional interests. When he makes his creative leap his enthusiasm, his idealism and his vision often defeat his own noble ends, because he has not taken into account simple qualities of people themselves, their resistance to change, in short, *their* point of view. He is not yet fully aware of the attitudes of people singly, in groups, or in the mass. This is where statesmanship comes in. The architect-planner must know what it means when we say "grass roots" and "ground-swell." He must know what it is to have "an ear to the ground." He must be able to interpret the collective thoughts and dreams of people. It is here that we need an Expert in Government; the architect-planner must look to him, and they must both be part of the team.

I am suggesting the impossible, but in order to accomplish the impossible, there must be a beginning.

IV.

Let us start with a statement.

"The Nine States of the Middle Atlantic segment of the United States, recognizing their obligations to the future, are determined to conceive of a fluid document focused on ultimate needs, but cognizant of the pressures of the present; a plan which they will keep in a constant state of re-evaluation." This will be no static concept.

Planning must be initiated, financed and maintained by these States, not by the Federal Government. Having recognized the need, they carefully organize a group to define problems. This is where research enters the picture. The acknowledged experts must be called in to form a Research Group; not to solve problems but, as we have said, to define them. Let the sum of \$30,000 per year be made available by each of the Governors for a period of five years. This sum would go into a common Planning Fund. Could any Governor get more for less?

Fine work is being done in planning, but the area of interest is apt to be overly localized. The several states cannot afford to avoid defining their mutual problems, nor to wait until a state of emergency precipitates emergency solutions. The sum of \$270,000 per year could sustain a research program of several years.

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PATTERNS OF RESPONSE

by Robert C. Wood

The following article forms part of a paper, written for the Committee for Economic Development and entitled "Metropolis Against Itself." Dr. Wood, Associate Professor of Political Science at MIT and author of the paper, here discusses the manner in which metropolitan governments are reacting to the new pressures created by growth.

When we identify the cumulative pressures on modern metropolitan governments, and when we note simultaneously that these governments manage to survive, we are in effect saying that the regional political systems have not been insensitive to change. But simply listing the demands—while observing that orderly community life goes on—gives no real insight into what has been an extraordinary process of adaptation and innovation. Bit by bit, metropolitan jurisdictions have retooled their administrative and financial structures, and built up elaborate mechanisms which, in one way or another, have coped with the pressures of growth. Not all these special devices and arrangements seem satisfactory for the present or the future—but they deserve to be understood before proposals for widespread reorganization are entertained. And they should be recognized for what they are: attempts to deal with the massive demands of growth while remaining faithful to the principles of autonomy and diversity.

The expansion of the service state

The record of metropolitan government is clearest so far as the fulfillment of urban service requirements are concerned. One way to indicate the dimensions of this reaction is to trace the level of government expenditures. Between 1902 and 1956, the annual outlays of all local governments increased from \$700 million to about \$28 billion. Since World War II, the rate of increase has accelerated. Between 1942 and 1953 local expenditures almost tripled. In the next four years they rose another 33 per cent.¹ No separate series for metropolitan governments as a class is readily available, but it is clear that they have borne the brunt of the increase in the total cost of local government, and bear most of its cost today.

On the basis of their share of national population and of its growth, of past and present differentials in per capita costs among cities of various sizes, and of the number of local governments within metropolitan areas, their share of present spending can be conservatively estimated at \$22 billion and their share of the total increase is at least 60 per cent.² In the New York Region, for example, governments spent a total of \$3.2 billion, or \$237 per capita compared to expenditures of \$700 million and \$211 respectively in non-metropolitan areas.³

Almost a third of the total increase in expenditures for metropolitan areas can be written off to inflation, and about another 22 per cent to simple population growth. But after the figures are corrected by these adjustments, they are more than double what they were even as late as 1930. Changes in the level and scope of services comprise, therefore, the predominant part of their increase. It seems clear that to the degree that they provide services above the minimum, metropolitan governments have been attuned to the changing tastes of their constituencies.

Thus, a case history of Detroit reports that in the prewar period 1900-1940, the number of that city's municipal services increased from 140 to 256. Moreover, the array of new programs and improved products which Detroit provides is typical of the public activities of almost every fair sized city: high pressure water systems for fire protection, health clinics, traffic signals, classes for handicapped children, recreational programs, parking lots, hospitals, ambulance services, branch libraries. To this increase in the number of services can be added improvements brought about by technological advances in customary fields of public responsibility: more thorough health examinations, better fire and police equipment, more effective case work in welfare. And further changes have taken place in the professionalization of urban bureaucracies, the widespread adoption of the city manager program, the extension of civil service and the promotion of general career programs. These innovations in administration clearly add to the cost of metropolitan governments, but also they are indicative of a much greater proficiency in

urban management than existed fifty years ago.

Moreover, metropolitan governments as a class have accomplished this substantial upgrading and expansion of services without imposing any overwhelming drain on regional resources. Expenditures in the public sector have increased at a somewhat faster rate than in the private sector in the last ten years—but this trend is in keeping with experiences of all governments whenever industrialization and urbanization have occurred. Over the long run, public expenditures in metropolitan areas are estimated to range between 3 and 10 per cent of regional income. At least, this has been the experience with respect to the relation of total local expenditures to national income, peaking at the end of the twenties and in the early thirties, falling sharply in the succeeding fifteen years, and rising again after World War II.

Local debt has followed a similar course. It was 28 per cent of net national product in 1932, declined to 6 per cent in 1945, and stayed at approximately that level until the last four years. As of 1956, local net expenditures were 8 per cent of national income and local debt 9 per cent of net national product.⁴ Experience in one metropolitan area where regional income figures are available suggests that outlays for metropolitan governments fall generally within this range, for in 1945, estimated total public expenditures for the New York Region as a whole amounted to 5 per cent of income, and 10 years later had risen to about 9 per cent.⁵

These figures indicate that certainly no massive shifts between the public and private sectors have occurred, and no crushing tax burdens have generally resulted. Indeed, so far as the major source of local revenue is concerned, the President's Commission of Intergovernmental Relations concluded:

"The \$9 billion produced in 1953 by local general property taxes represents little more than 1 per cent of current values of privately owned land, structures, and equipment—the elements in tangible national wealth that comprise the bulk of property assessed for local taxation. While the effective rates of these taxes vary widely, they are equal to substantially less than 1 per cent of appraised values in many parts of the country in most pressing need of additional local revenue."⁶ Experience in New York confirms this generalization: when total per capita tax levies were expressed as a percentage of per capita market values of real property, the ratio actually declined over the ten year period.

Intra-regional variations

Of course, it is important to point out that the overall trend of local expenditures in metropolitan areas is composed of a number of widely different experiences on the part of individual jurisdictions. A major consequence of the present pattern of government is that it divides and sorts out the general pressures for expansion. Each government faces a special combination of "irreducible demands" and public propensities for services. With the suburban areas adding residents seven times as rapidly as the central city, and with the bulk of this increase taking place on the fringe, the impact of a population increase falls far more heavily on some municipalities than on others. Further, as history freezes the land use, housing, and street patterns for generations to come, quite separate public problems emerge in each jurisdiction and quite different responses result. Thus, in the New York Region, in 1955, the per capita total public expenditures in the highest cost jurisdiction was over 700 times greater than in the lowest, and the highest per capita current operating expenditure

was 85 times larger than the lowest.⁷

The obvious differences in the pressures which the governments face are accentuated by their differences in taxable wealth. Generally speaking, jurisdictions with the highest population densities and the most critical conditions of congestion and obsolescence tend to rank at the bottom of all metropolitan municipalities so far as income or property valuation is concerned. Thus, the relative effort of these municipalities must be much greater than the less-densely populated, well-to-do governments, as they try to meet much more powerful pressures of urbanization. As early as 1930, tax rates among metropolitan suburbs in New York ranged from \$2.21 to \$4.73 per \$100 market valuation; in Detroit, from \$1.89 to \$2.54; in Cleveland, from \$.93 to \$2.19; and in Boston, from \$1.92 to \$4.88.⁸ Today, investigating tax conditions in the New York Region, Alan Campbell likens the area to a 7,000-square-mile jungle which "abounds with tax growths in a startling variety of shapes, sizes, and combinations." He found average real tax levies to vary as much as two and one-half times.⁹

What results from this inverse relation between density and wealth is that a spectrum of government services appears. Some municipalities spend money because they have to, and others because they want to. Some budgets are "controlled" by the imperatives of maintaining minimum levels of public investment, and here the demands are literally insatiable, while others are "free," for wealth exists in such concentration as to permit expenditures at whatever level the citizens may desire.

Thus, high-value residential areas, where taxes per unit typically exceed the cost of services provided, are able to maintain blue ribbon services with comparatively little drain on their resources. Predominantly industrial enclaves, where manufacturing plants provide revenue windfalls, may become financial oases, literally unable to prevent their tax rates from falling no matter how lavish their public budgets become. For less well-to-do governments with more residents per acre, expenditures required even to maintain existing service levels grow faster than increases in the tax dollars, so that an increasing proportion of available resources is absorbed. In these instances, even the relatively larger diversion of income to public purposes does not result in service standards comparable to more fortunate municipalities.

This mismatch between supply and demand is likely to be especially evident in the central cities. Here, "necessity" spending brought about by obsolescence, congestion, and the concentration of lower income families is particularly intense. But the relative and sometimes absolute decline of industry and commerce is also greater in the central city, as growth and diffusion go on. And it is frequently accompanied by a rise in the amount of tax-exempt property.

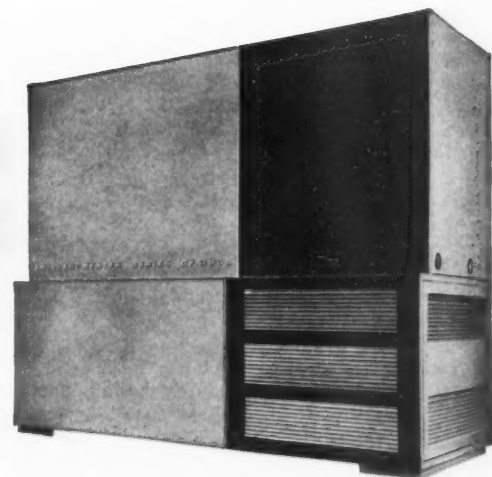
Boston provides the extreme example. In 1930, its assessed valuation of taxable property was \$1.9 billion; in 1951, it was \$1.5 billion—four hundred million less than the value twenty years earlier. During the same period, the value of tax-exempt real estate increased by \$216 million, from 19 to 40 per cent of total real property value. Boston's case is atypical at least in degree, for at the other extreme, New York City's assessed valuation has increased since 1945 from a low of \$15.5 billion to almost \$22 billion. Yet even in New York the increase in the value of

(Continued on page 20)

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PATTERNS OF RESPONSE

(Continued from page 19)

land used for tax-exempt purposes has paralleled the growth in total valuation, and the expansion of the resource base has been consequently retarded.¹⁰

These variations in pressures, taxable resources, and service levels sharply modify the comfortable picture of the regional political system attending with some modicum of adequacy to the needs of all its citizens and living within its total means. The dark corners and trouble spots of each metropolitan area raise the obvious issue of equity—of why members of a labor force working within a single economic system receive different public services and pay different tax bills because of their residential location. And they qualify the general rule of metropolitan self-sufficiency so frequently as to bring forth continuous and sustained criticism.

Yet, even in these instances, the record is not entirely barren of accomplishments. Though few metropolitan areas have moved decisively to correct the misallocation of needs and resources, all have shown considerable ingenuity in developing contrivances to mitigate the circumstances of the less well-to-do jurisdictions.

These efforts form the second half of the service response of the regional governments to change—a story of such elaborate and complex arrangements and relationships as to make the metropolitan areas the seedbed for more American political inventions in the last twenty years than the nation has produced throughout its entire history on the state and national level.

Bootstraps

Essentially, the response of the resource-poor governments has been to meet the service problems arising from multiplicity by a policy of more multiplicity. By creating new units of government, by establishing new channels to available resources, and by broadening their relations with higher levels of government—in brief, by continued proliferation—the have-nots have continued to bail themselves out. The results are sometimes bizarre—but the policy maintains autonomy and diversity and staves off the specter of consolidation and combination.

A favorite strategy for jurisdiction outside the central city is the special district: a device used primarily by one or two municipalities to extract more revenue from the same tax base. In the rapidly growing, lower middle-income suburbs, as the budgets of one government after another reach state-imposed tax and debt limits, the special district is used as an avenue of escape in providing the services which may be identified with a particular geographical area—street lighting, refuse collection, water and sewer systems. The creation of these units does not typically extend the tax base over any substantially larger area than a single jurisdiction, but it does allow the resources which are available to be tapped more frequently.

Thus, a property owner in Hempstead, Long Island, may receive a consolidated tax bill representing the levies of 10 separate service districts, as well as a separate bill from his school district, with separate

rates imposed by each on his total property valuation. Old residents of the community can thus avoid the extra costs which newcomers impose by subdividing their municipalities again with a special district consigned to each new neighborhood. With these arrangements obviously mitigating the short-run consequences of growth, it is not surprising that the bulk of the 2,598 non-school special districts now in operation in the 174 areas are smaller in their respective areas than the original municipalities themselves.¹¹

For the central city and other large jurisdictions, another strategy is usually available. Instead of a proliferation in units, an extension of authority to tap more sources of revenues is employed. In these areas, a steady expansion in the local tax base has occurred in the post-war years. Municipal income taxes, sales and gross receipt taxes, tobacco and admission levies multiplied six times between 1945 and 1955 and now account for 27 per cent of all local revenue. Beginning with limited breakthroughs by New York and Philadelphia in the 1930s, sales and gross receipts taxes were accounting for 11 per cent of the revenues for cities over 25,000 in 1953, and flat income taxes existed in 27 cities. California had 200 local sales taxes; and in Pennsylvania, 415 income taxes were being imposed. A host of minor levies has also been applied so that, in 1956, city charges and miscellaneous revenue amounted to 13 per cent of total city revenues, utility and liquor store charges 20 per cent, sales taxes 7 per cent, income taxes 1.5 per cent. As these revenues have grown, the share carried by the property tax has fallen to 36 per cent.¹²

These alternative avenues for tapping metropolitan resources bases do more than bolster real property levies which may be hard pressed. They also provide means for reaching the commuter and insuring his contributions to service costs. Mabel Walker has reported that Philadelphia obtains about 15 per cent of its income tax receipts from commuter sources; St. Louis 25 per cent; Cincinnati 17 per cent; Dayton 20 per cent; and Pittsburgh 10 per cent.¹³ When taken in conjunction with the increasing application of user charges by general governments and special districts alike, they point up at least the emerging possibility that central city tax systems will gain substantial access to the resources of the metropolitan area as a whole.

Finally, for certain services, particularly hard-pressed governments are showing a disposition to tiptoe toward limited interdependence. Largely spurred on by financial considerations, these units have developed a complex series of intergovernmental working arrangements, a very few verging on outright combination but most dealing with specific service problems. In some instances, these take the form of limited annexations, usually in pieces less than a square mile. In a few cases, major annexations or consolidation of functions at the county level take place, as in California where 1,700 transfers from city to county have occurred.

But by far the most frequent form of collaboration is one in which no surrender of local prerogatives is involved. Under either general or special state enabling legislation, metropolitan units have joined forces in the joint provision of election services, public health work, building inspections, and welfare, tax, and civil service administration. Usually, these agreements involve only two governments and a single function, and come about only when a special problem becomes critical. Nonetheless, they rep-

resent some recognition of interdependence and some manner of joint actions in meeting service demands.

Big brothers

As impressive as the bootstrap efforts of the have-nots have been, however, their independent actions in measuring up to their service role has been overshadowed by the steadily growing contributions of State and Federal aid. In 1932, the States allocated about \$800 million to their local governments, and received in turn some \$228 million from Washington. In 1956, in the Nation-to-State-to-Local fiscal double play which characterizes the modern Federal system, Washington allocated over \$3 billion to the States in grant-in-aid, and the States distributed \$6.5 billion to their local governments. Another \$309 million came to the localities from the Federal government directly, and the grand total of State and Federal aid was 26 per cent of their revenues from all sources.¹⁴

These grants are, of course, for specific functional areas, and they are usually calculated, with the outstanding exception of education, without regard to specific needs or financial capacity. Given the legislative compassion for rural communities, metropolitan areas do not receive aid in proportion to their populations. School districts fare best, receiving on the average 43 per cent of their revenue from outside sources. Counties follow closely with 38 per cent. Townships depend on grants and shared taxes for 25 per cent of their funds, while cities obtain about 14 per cent, and the larger the city, the smaller its share within this average.¹⁵

Yet metropolitan governments, particularly in the outlying belt, do not come off too badly. The small size of many suburban units entitles them to treatment which the legislatures may have intended primarily for rural areas. It may also, as in the case of small school districts, provide higher-per-pupil grants than would be available if consolidation were undertaken. Finally, the very proliferation of political jurisdictions in the metropolitan area allows a more complete exploitation of the various sources of Federal and State assistance than would otherwise be possible. Double-counting in units often results in double-counting in State payments, and the existence of another jurisdiction sometimes means the availability of another grant. In short, the higher levels of American government not only underwrite a considerable portion of the metropolitan area's growing expenses by bailing out the poverty-stricken communities—they tend to underwrite and make more palatable the present governmental system itself.

Balance sheet for services

Through such a combination of stratagems, special devices, and outside aid, the metropolitan governments reduce the extreme consequences of dividing their population and resources by haphazard boundary lines. The have-nots scrape together sufficient tax dollars to meet minimal requirements and to join the wealthy communities in a steady increase in their expenditures. Nothing approaching equalization occurs, but in the New York area, for example, the range between the lowest and highest expenditure units has been gradually compressed over the last ten years, and the average operating expenditure of the Region's municipalities has more than doubled.

At the very least, the bedrock demands are fulfilled. Traffic continues to circulate, highway congestion and mass transit deficits to the contrary notwithstanding. Water is provided; hospitals and parking lots are built; schools keep their doors open,

even though double sessions may become necessary; criminals are arrested and prosecuted; fires are put out; more municipal amenities exist than ever before.

In short, while organizational and financial contrivances which provide these services can be criticized as inefficient, unfair, cumbersome, and wasteful, it is difficult to say that they do not work. And, from the perspective of the economic historian, it is hard to conclude that metropolitan governments have, on the average, been insensitive to change, or to judge their response to the pressures for more and better services as abnormally sluggish. On balance, one emerges more impressed with the governments' ingenuity in assembling forces to sustain themselves in their independent roles than expecting the superstructure to crumble.

Taking government out of politics

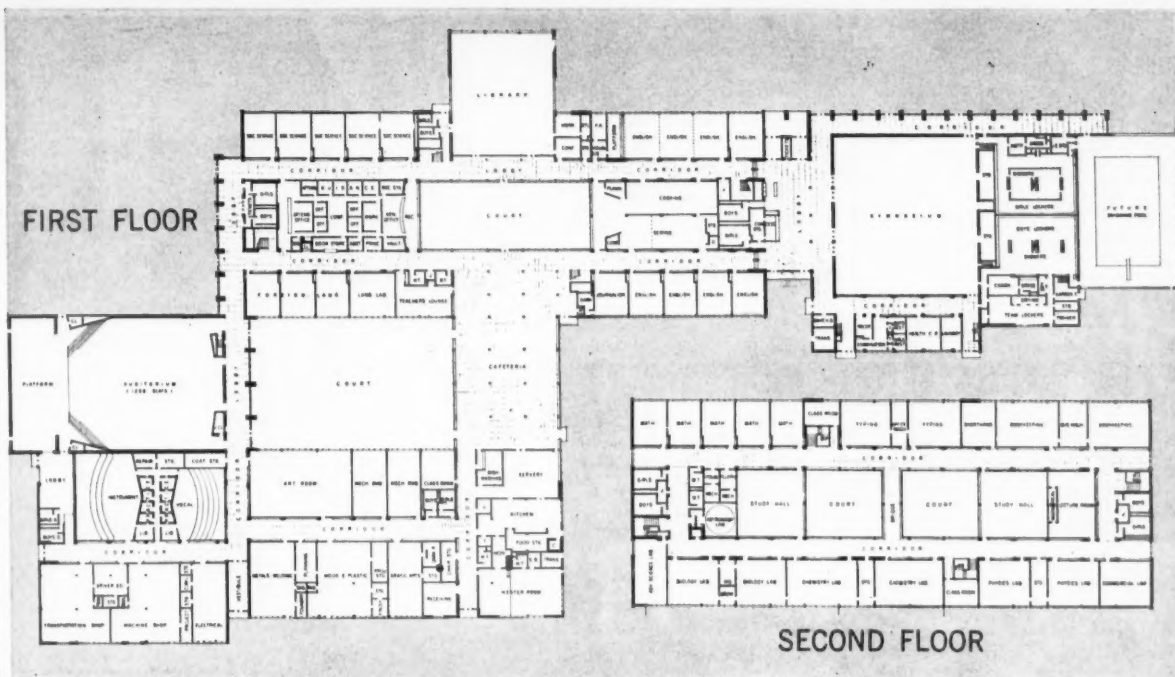
One reason we have focused at such length on the efforts of metropolitan governments to deal with their modern service responsibilities is that the rather substantial accomplishments in this area have often been slighted. Another is that these responsibilities have been the central concern of the governments themselves. But an even more important reason for the emphasis is that it is impossible to understand how metropolitan governments have dealt with their other responsibilities for region-wide services and for policy-making, unless we first understand their complex arrangements for providing basic community facilities. The creation of special districts, the painful expansion of local tax bases, the perfection of grants-in-aid techniques, have resulted in an elaborate array of jurisdictions and intergovernmental relations which seem passably adequate for the discharge of service duties. But, by the same token, the accomplishments in one field add complication in others—and the result is the abdication and frustration of programs designed to meet region-wide needs or provide guidance for the direction of metropolitan growth.

Abdication is the response of the service-oriented structure so far as the provision of regional facilities is concerned. Metropolitan governments, intent on preserving legal autonomy, and pursuing a policy of continued proliferation, have found it difficult to devise integrated programs on matters affecting the regions as entities. Generally unable to develop a single transportation system or a coordinated program for water use by voluntary cooperative agreements, the jurisdictions have retired from the field. They have left these duties in the hands of business-like public authorities or independently managed state agencies. They have, in effect, taken regional government out of regional politics in the customary sense of the word.

Thus, the principal way in which big governments and formal recognition of interdependence have entered metropolitan regions is a non-political route: through the public corporation, the quasi-independent state commission aloof from the ordeal of vote-getting, the large special district which builds and manages the bridges, terminals, docks, tunnels, airports, and water systems of the regions. These agencies, together with *ad hoc* and limited inter-municipal agreements, provide the essential, if limited, means for maintaining the metropolitan circulatory system and ensuring access to the natural resources essential for the maintenance of life and property.¹⁹

Thus, in every metropolitan area, pseudo-governments have appeared, authorized to do what must be

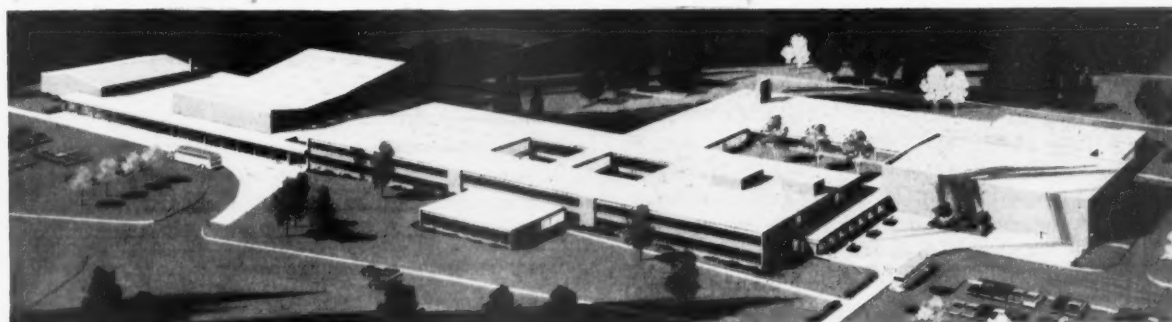
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PATTERNS OF RESPONSE

(Continued from page 21)

done if regional development is to continue. No period in the history of local American government has witnessed such a spawning of government corporations, boards, and commissions, as the decades between 1920 and 1950. The Port of New York Authority, the Boston Metropolitan District Commission, the transit authorities in many areas, the Golden Gate Bridge and Highway District, the North Jersey Water Supply District, the Chicago Park District, the New York Triborough Bridge and Tunnel Authority, are the instruments through which metropolitan residents are assured of access to work, are guaranteed water, prevented from succumbing to disease borne on contaminated rivers, spared the worst conditions of smog, and guaranteed the goods and services necessary to support life. Assisted by state highway departments and park commissions, these agencies make the metropolitan environment tolerable.

Of course, they add to the number of public organizations already operating within the regions, and they tap funds which conceivably could be used by the general purpose governments themselves. But few metropolitan governments regard them as threats to their existence for they have the built-in limitation that their activities must produce revenue; they cannot stray too far from a self-supporting budget, and consequently many municipal activities are beyond their reach.

Meanwhile, they provide competent engineering solutions to vexing problems, they take the pressure off the political system as a whole, and their records of honesty and accomplishment reassure the constituency. Their existence does not mean that all regional problems are attended to, nor that their programs necessarily make the best sense in terms of long-run public policy. Still it does mean that something is done. Metropolitan governments are spared the pain of devising more general solutions, and they are left undisturbed in their process of creating more and more units to deal with the local service problems which press upon them.

Policy by competition

The rise of regional authorities fills one vacuum which a predominantly service-oriented governmental structure creates. There is, however, a final responsibility which the political system has to discharge. How can it tell if its efforts are sufficient to the problems of the day; how can it positively stimulate and aid in the private development of the region; how can it curb excesses in this development; how can it determine goals and set standards for the region as a whole?

At this juncture, the carefully constructed arrangements for multiplicity and diversity result in massive frustration. By its very design, the structure built to provide tolerable levels of urban services with each jurisdiction going it alone, raises major obstacles for the formulation of regional policy. It proves itself incapable of providing the regional economic system with what Paul Ylvisaker has termed "the supplementary action and counter-



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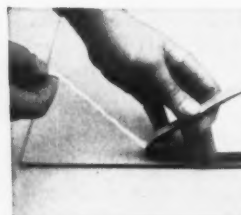
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vailing power of a corresponding governmental process.¹⁷

A moment's reflection makes clear why the present structure of metropolitan governments is incapable of discharging this function. The independent municipalities are all deeply engaged in bettering their ability to supply the services their residents require. The regional corporations are committed, by statute and financial considerations, to particular solutions of particular problems. What results is a competitive scramble for available resources and power. The notion that there might be common goals and resources becomes lost in the struggle—indeed, in many regions, the concept is not permitted to exist at all.

The built-in processes which thwart metropolitan policy-making reveal themselves most clearly at the local municipal level. Here the fixation with problems of local self-sufficiency leads inexorably to a strenuous game in which the objective of any competent government is to capture the choicest portions of the new resources the metropolitan economy is creating.

George A. Duggar has outlined the rationale which under the present system any prudent and responsible local official is led to adopt.¹⁸ Since the property tax is still the major source of revenue, the obvious course of action for any single jurisdiction is to strive to attract the greatest possible amount of high-value property within its boundaries. As Duggar demonstrates, high-value property on a per foot or per unit basis typically returns more in tax revenue than the cost of the public services it requires. At the same time, the individual property owner finds that the service benefits added to the value of his property are more than the taxes deducted. This occurs since the benefits accrue to the total value, while tax costs are related primarily to improvement value, and usually in high-value property the ratio of improvement to total value is small. On the other hand, Duggar points out, low-value property not only costs the government more in services on a per unit basis than it returns in revenue, but also adversely affects the property owner. Here the ratio of improvement to total value is much larger, tax costs are proportionately higher than service benefits, and in extreme cases, they may even reduce the market price of low-value real estate. These considerations provide strong inducement for each municipality to engage in "a sort of mercantilist interplay, fighting to keep its taxes down and its ratables up."¹⁹

Documentation for Duggar's arguments is not hard to find. Increasingly, municipal promotional and regulatory powers have been turned into weapons to protect or enhance a jurisdiction's supply of resources. The now fashionable search for "light industry" is one weapon employed by governments which have dwindling amounts of undeveloped land and are seeking to entice new plants regardless of the intrinsic economic value of the particular sites involved. Other standard tactics are to impose special requirements and restrictions on builders, to employ the power of eminent domain, to control and guide private land development, and to discriminate in the provision of services. And all the while, each government undertakes a constant study of the metropolis to make sure that no unwelcome development is permitted.

But by far the most effective weapons are the zoning and planning powers. Here the techniques which theoretically promise the most for orderly

regional development are turned to provincial purposes and set to work to capture high-value property for individual municipalities. For parts of the New York Region, Henry Fagin has documented their uses:²⁰ the case of the New Jersey township which declared an informal building moratorium "until 'the law' finally caught up with it"; the suburb which precluded mass development by requiring that each house differ in key design features from five of its neighbors, the borough which owns one-third of the land within its borders and sells lots at the rate of a dozen a year to buyers of its own choosing; the celebrated case of Wayne Township, New Jersey, where the government not only established higher minimum prices for new houses than old and more stringent zoning requirements, but also required a larger living space for houses without garages than those with these additions attached.²¹ Together with the increasing number of municipalities which established minimum lot sizes of three, four, or five acres, Fagin found as his extreme example the town which, in his judgment, was deliberately reducing its expenditures for schools in an effort to discourage the influx of lower-income residents.

To some these policies raise questions in ethics, for clearly their over-all effect, as Fagin wrote, is that "the very cities that can most easily afford to carry the burdens of inexpensive homes are the ones which most vigorously resist such homes and are the most successful in avoiding them."²² But given the tax system and the multiplicity of jurisdictions, it is difficult to see how policy-making can go in any other direction. It is obviously legitimate for every government to determine its land use pattern, to look ahead, forestall blight, and develop in a manner its present residents desire. In existing circumstances, town fathers can scarcely afford not to practice discrimination. So long as all the industrial and residential land uses of the metropolitan region which, taken together, provide balance to the tax structure are not within one jurisdiction, a municipality which welcomes lower-income newcomers invites financial catastrophe. Common sense dictates that competition go on even if the result is to distort the process of industrial location, buttress impulses toward exclusiveness, and establish tax inducements and special privileges as permanent public policies.

The governments which win have all the more economic reason for opposing devices for collaboration and coordination. Those which lose tighten their belts, reduce service levels, or search for additional sources of revenue. They learn to live with widening areas of blight and obsolescence within their borders, bear the additional costs these neighborhoods require, and watch their constant encroachment on other neighborhoods speed the migration of industry and middle income families. If the poor municipalities are located on the fringes of the metropolitan area, they practice amateur government or create special districts in order to obtain additional revenue. But whether central city or suburb, these jurisdictions look most of all for aid and comfort from the State and Federal governments where the financial effects of the property tax do not come into play. Preoccupied with the struggle within their own boundaries, they have little time or inclination to worry about how the region itself is developing.

Authorities and school districts

While the majority of general-purpose metropolitan governments are understandably engaged in protecting their own, large special districts and authorities engage in their own brand of competition

at a different level and with different weapons. Because of the nature of their programs, the rivalry of these agencies is concerned with regional affairs, but it usually revolves around the issue of what function or activity will receive prior treatment. Thus the policy-making process parallels in purpose the divisive conflicts of the municipalities, for the regional agencies are likewise engaged in institutional competition for survival.

The development of educational programs provides an example of one type of functional policy-making. By long-established tradition and by a tightly-reasoned argument that education is a "unique" public function on the American scene, schools operate almost universally under special political and financial arrangements. Although in a few cities the municipality has the responsibility for public education, the usual metropolitan school system is composed of separate districts, each with independently elected officials, an independent administrative organization, and separate access to the property tax base and state funds. Thus, the school governments generally succeed in formulating their own goals and devising their own response to metropolitan growth.

This response is in one sense passive, because lacking land use controls, school districts must accept the consequences of whatever influx of school population occurs and whatever taxable resources result. But in another sense, school districts, by preserving their independent arrangements, are able to have considerably more leeway in fashioning their response. Since their programs are considered separately from other needs and since their grants from the states are typically based on sophisticated calculations of needs and resources, they isolate their requirements from the rest of the region's needs. The result is a reduction in the service differentials which multiplicity and diversity impose on the general governments. But the result is also a second type of fragmentation, on a functional basis, of metropolitan policy-making.

Another type of functional policy-making occurs where the activity not only has been separated from the stream of general governments but also has been divorced from direct responsibility to the electorate. In the regional public corporations and authorities, region-wide consideration of goals for development is possible, but this consideration does not balance one service area against another. It does not even make sure that alternatives within a given service area are evaluated.²³

Transportation serves as the prime example. The well organized, effective authorities operating in this field make careful and expensive studies to determine the requirements for moving goods and people on a metropolitan basis, and often maintain the best trained planning staffs available. Yet each authority typically has responsibility for only one form of transportation and none has the assignment to develop and put into effect an over-all approach for transportation development. Therefore, nothing is more natural than for each to discover that its facilities are the best equipped to handle the transportation problem—and that its sister institutions, sad to say, are supporting modes of transportation which inexorable technology has rendered obsolete.

With responsibility shared, as Wilfred Owen points out, "by private transit companies, bridge authorities, parking agencies, local highway departments, state highway departments, police and traffic departments, and railroad and taxi companies," it is

(Continued on page 24)

PATTERNS OF RESPONSE

(Continued from page 23)

not surprising that bitter bureaucratic struggles break out. Nor is it surprising that no balanced consideration is given to over-all transportation needs. With the best intentions in the world, and with the most sensitive reading of the public pulse, no authority can undertake to go beyond its legal and financial limits to encompass the dimensions of the problem and to offer an integrated answer. The autonomous public corporations labor separately to break highway bottlenecks, construct expressways, lure passengers back on mass transit systems, and perfect new modes of transport. Since the agencies concerned with highway facilities usually possess superior financial and administrative resources, a steady drift toward reliance on the automobile as the major carrier of people and goods occurs without regard to the benefits possible in rail or mass transit. In any event, the development of regional transportation systems goes on in an atmosphere of charges and countercharges, recriminations and accusations which make a difficult problem even more difficult to understand.

The situation in transportation is repeated, with variations in scope and degree, in water supply, pollution control, and recreation. In all these fields, many agencies at every level of government have a hand. Given the necessity for each agency to preserve its own authority, it is to be expected that each will cultivate its own garden, provide solutions within the circumference of its own authorizations, protect its flanks from attack, proclaim its own efficiency, and expand its own facilities as resources and opportunities permit. Regional policy is made, but it emerges as the result of the interaction of agencies, each building its prestige and its record of accomplishment on the basis of assiduous attention to one part of one problem.

Thin red line of leadership

The competitive position of metropolitan governments—municipalities, special districts, and authorities alike—effectively forecloses the chance for official policy-making on a regional basis. Not only are there no institutions equipped to consider goals, decide priorities or determine objectives, but also there are no institutions inclined in that direction. Perforce, the making of regional policy falls to private persons and groups operating without formal sanction. These groups make up an embryonic coalition of politicians, educators, businessmen and labor leaders whom Paul Ylvisaker has characterized as having "an 'angle, and a self-interest . . . a gilt edge' in the future metropolis." In this assortment, the sources of leadership and direction for the metropolitan areas now reside.

The voluntary organizations of governmental officials form the smallest but most visible part of the coalition.²⁴ The Metropolitan Regional Council in New York and the Supervisors Inter-County Committee for Detroit are two such major public bodies meeting regularly to consider metropolitan affairs. Their record of accomplishments in obtaining agreement on various intra-regional matters is by and

large impressive, but lacking formal power or authority, they must necessarily act in substantial unanimity, and they are by no means ready to tackle the tough issues of priorities and goals.

Official regional planning agencies, as distinct from associations of elective officials, are a second source for metropolitan policy. These bodies are likely to be more firmly grounded in terms of legal authority than the first type of public organizations, especially when the metropolitan area is contained within a single county. But planning, even when professionally staffed, represents at best only the initial step in the policy-making process: the identification of the problems and the presentation of alternatives. Even the most active of the commissions now existing in Detroit, Washington, Los Angeles, Cleveland, Seattle, Cincinnati, and elsewhere can only raise issues for consideration; they cannot resolve them. And, in the larger regions, the agency is likely to be a "floating" one; it has the power to recommend, but no government is obliged to receive the recommendations.

The private groups concerned with metropolitan affairs are larger, stronger, and more influential than the public organizations, and their activities are growing. The Greater Philadelphia Movement, Pittsburgh's Allegheny Conference, Civic Progress, Inc., in St. Louis, and the Greater Boston Economic Study Committee are important participants in regional decisions over a wide range of community affairs. Chamber of Commerce-type organizations become involved on a narrower range of problems—and with a narrower set of objectives and interests. Development foundations, such as the Old Philadelphia Development Corporation and the Cleveland Development Foundation, provide stimulation and capital on the economic front, and quite frequently utility companies, having an obvious stake in regional development, figure actively in the consideration of metropolitan affairs.

Civic organizations—the Metropolitan Housing and Planning Council of Chicago, Cleveland's Citizens League, and the Regional Plan Association in New York—also play a part in promotional and advocacy activities. Universities and private foundations sponsor and undertake research; the press frequently adopts a metropolitan outlook; and professional societies of engineers, lawyers and architects often have standing committees on metropolitan affairs. While the relationships among these various private groups and interests are still obscure, their combined political weight is bound to be substantial.²⁵

However active and well-intentioned, none of the present spokesmen for the region at large, public or private, individually or collectively, can be said to be providing coordinated policy leadership. First of all, even though they may speak for important interests in the regions, these groups still represent only a small minority of the areas' population. More important, they lack what effective policy-making requires: an adequate institutional base, legal authority, direct and regularized relationships with the metropolitan constituency, and established processes for considering and resolving issues as they emerge.

Lacking these things, they are not governments and they do not speak with the voice of governments. For the most part, the leaders of the interlocking directorate of metropolitan civic activities appear in the role of political diplomats, agitators, and brokers. Regional policy is bootlegged into existing councils of state, where its reception is uncertain and its application dependent on voluntary acceptance.

In an evaluation, Dr. Wood considers the tendency of government to work at cross purposes to the economic system the most serious of the consequences of existing organization.

If these consequences seem undesirable, and if their deficiencies appear to outweigh the advantages of diversity and insularity, then quite obviously a new and different philosophy of government is in order. The requirements of policy-making will have to take precedence over the requirements of simply maintaining some semblance of organized community existence. The carefully devised structure to permit a tolerable flow of public investment will have to give way to a structure which has the authority to make decisions about the region's transportation network, its broad pattern of land use, its common recreational facilities, the renewal of its obsolete sections, the contamination of its air and streams, and the preservation of nature's amenities. The system of representation—of individual citizens looking directly to one small government or to no government at all—will have to be replaced by a system which uses parties, pressure groups, professional politicians and executives and legislators elected on a regional basis—in short, by a modern democratic system.

There are on hand half a dozen schemes for putting such a philosophy into effective operation. Perhaps the most popular is the proposal for a metropolitan federation, a system whereby only the most obvious regional functions would be vested in a single government, and the service functions retained by the individual municipalities. In some places, where the metropolitan area is still contained within a single county, the county government can be equipped with new powers and its organization and administration refurbished. Alternatively, it may be possible to expand the functions of a regional authority and to provide that its officials be elected instead of appointed. Still another method would be to establish one by one, a regional planning commission, a regional legislative council, or an assembly of locally elected officials. Any of these plans might work effectively during a period of transition in which a service-oriented system established for a rural nation adjusts to its urban policy role.

But all this can happen only if the residents of the metropolitan area change their concept of local government and are prepared to accept a philosophy of positive and coordinated action in place of a "business as usual" and essentially competitive philosophy. Not until such a change in attitudes and convictions occurs can local governments adapt to the metropolitan age and grapple seriously with the problems of metropolitan growth.

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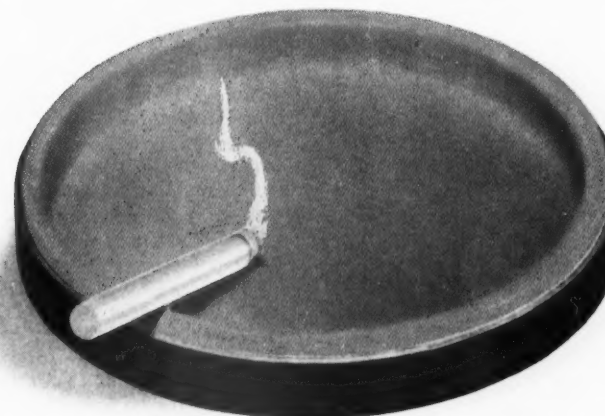
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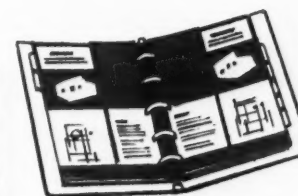
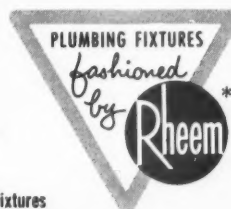
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ENGINEERING ASPECTS OF BUILDING MODERNIZATION

by Alfred L. Jaros Jr.

An important segment of urban renewal activity involves modernization of existing buildings. The following speech was given at a recent dinner of the Management Division, Real Estate Board of New York, Inc. Mr. Jaros is Partner in Jaros, Baum and Bolles, consulting engineers, New York City.

In a modernization program for an old building, the amount of mechanical work involved will vary greatly in different cases—but it will always be a major and important part of the program. This may include partial or complete air-conditioning of the building, new heating systems in other cases, new boiler plants where old ones are worn out or obsolescent, quite possibly new elevators of more modern type, and anything up to complete replacement of plumbing, electric wiring, lighting fixtures, and the like.

Any modernization worthy of the name will include a considerable amount of these items—and there will be fairly numerous cases where all of them may be involved.

That this work plays a major part in the economics of the entire project may easily be seen by considering the proportion which it represents of a new building. A great amount of published data indicates that—typically—in a new multi-story office building, at least one-third of the total construction cost will be the mechanical and electrical trades; if elevators, etc., are included, the proportion may well run midway between one-third and one-half.

Typical ratios would be: HVAC—18 to 20 per cent of the entire cost; electric wiring and wiring—10 to 12 per cent of the entire cost; plumbing, etc.—3 to 5 per cent of the entire cost; elevators, etc.—5 to 10 per cent of the entire cost.

In apartment houses, hotels, hospitals, and the like, the relative proportion of costs attributable to air-conditioning and lighting may shrink slightly from the above figures. On the other hand, there will be at least twice as much plumbing, a great amount of added ventilation for kitchens, laundries, and the like—and in the categories of hotels and hospitals, probably high-pressure steam service for these facilities.

On the whole, apartment houses may run slightly

lower in the proportionate cost of the entire mechanical and electrical services, while hotels and hospitals may run even higher than office buildings.

It should be clearly understood that the figures just quoted—and in fact, all figures given in this paper—are only what might be called typical average figures. Even in new buildings, these ratios will vary considerably with the shape, design, and quality of the building (and with its exact purposes); this will be truer with the modernizing of old buildings, having in view the great variation in the degree of modernization in different cases.

For modernizing old buildings, the proportions of total cost attributable to the mechanical and electrical work (for the same quality and capacity) will be, usually, a larger percentage—this is because the structural shell and foundations of the building, at least (and in most cases a good bit more than this) are already there and will be reused—so that the same "dollar value" for a mechanical installation will be a larger percentage of the total.

Typically, the object of modernizing an old building will be to enable it to "compete" with new buildings in which the mechanical and electrical installations are of modern and probably of complete character; to accomplish this objective; the point must be faced that the mechanical and electrical work in the modernized old building must at least approach in quality and completeness that which would be provided in a new building.

"Shortcuts" or "compromises" will undoubtedly be very attractive—but only the most expert consideration of results, maintenance cost, life, and satisfactory service to the occupants will enable the investor to judge what extent such shortcuts may wisely be employed.

One factor that cannot be ignored is the age of the old installations (even if they might otherwise be acceptable in character); obviously, it would be short-sighted economy to carry out a modernization which—it is hoped—will put the building back in the competitive market for the next 25 years, say, and as a matter of initial economy leave in service complex systems which may be expected to wear out in five or 10 years at which time the building will have to be "ripped apart," and its occupancy or the service of its tenants interrupted for a protracted period, in order to replace at greater cost what could have been done as a part of the original modernization.

Boiler plant

Except in cases where it is possible and economical to obtain steam as needed from a public utility serv-

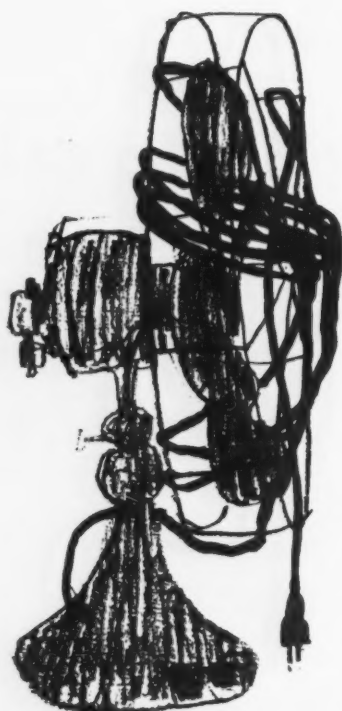


TABLE I—BOILER PLANT CAPACITY

Pounds/Hr. Steam/1,000 Sq. Ft. Net (Usable Space)	Office Building	Apartment	Hotel
Space Heating (only)	40	60	50
Domestic Hot Water Supply	5	35	50
Air-Tempering (ventil. or air-cond.)	20	10	30
Kitchen, Laundry, etc.	—	—	15
Probable Maximum Demand	65	105	145
Margin for Breakdown Protection	20	25	40
Capacity to Provide	85	130	185
Est. Usable Area/Gross Area	75-85%	60-70%	70-80%
Typical \$/1,000 Sq. Ft., Net (mech.)	375.	500.	925.
Typical \$/1,000 Sq. Ft. (space, elec., etc.)	60.	75.	125.
Typical \$/1,000 Sq. Ft. (total)	435.	575.	1,050.
Typical Cost, New Htg. Sys./1,000 Sq. Ft.	900.	900.	800.

ice, or from some adjoining building, a very serious look at the boiler plant is in order. Boilers that are more than 20 or 25 years old may be all right for a few years more—or they may already be ripe for replacement.

Boilers that are still usable with coal may have deteriorated to the point where it will not be safe to fire them with oil or gas. Boilers required to supply steam at considerable pressures may (with many types, at least) have deteriorated to the point where they can no longer be operated at the proper pressure for satisfactory service—and new uses for steam (for example, the operation of a refrigerating plant for summer air-conditioning) may require steam at pressures which the old boilers cannot supply.

It may be pertinent to consider typical examples of required boiler plant capacities and costs—bearing in mind that the figures given in Table I are only "typical," and may vary widely in individual cases. (Note: In Table I, attention is called to the item, "Breakdown Protection." All boiler plants should include a sufficient "margin" or reserve capacity, so that service will not be too seriously impaired if one boiler is "out" for repairs.)

The cost of the mechanical installation, proper, may be expected to run between \$4 and \$5 for each pound per hour of steam capacity installed, for an apartment house or an office building, and at least \$5 per pound for a hotel or a hospital (where higher pressures are required). These figures include oil burning equipment, pumps and other auxiliaries, instruments, etc.—the complete boiler plant equipment; but an additional sum must be figured for constructing the space (unless an existing boiler room can be utilized without changes), for constructing or repairing chimneys, and for the electric power service as required in a modern boiler plant.

The last line in the tabulation gives a typical figure for the cost of installing a new complete "heating system"—piping, radiators, and all the rest of it—if this part of the old installation must be replaced, and if the building is not to have general air-conditioning; this figure will vary greatly with the conditions of the individual building, but not too greatly with the precise type of heating used.

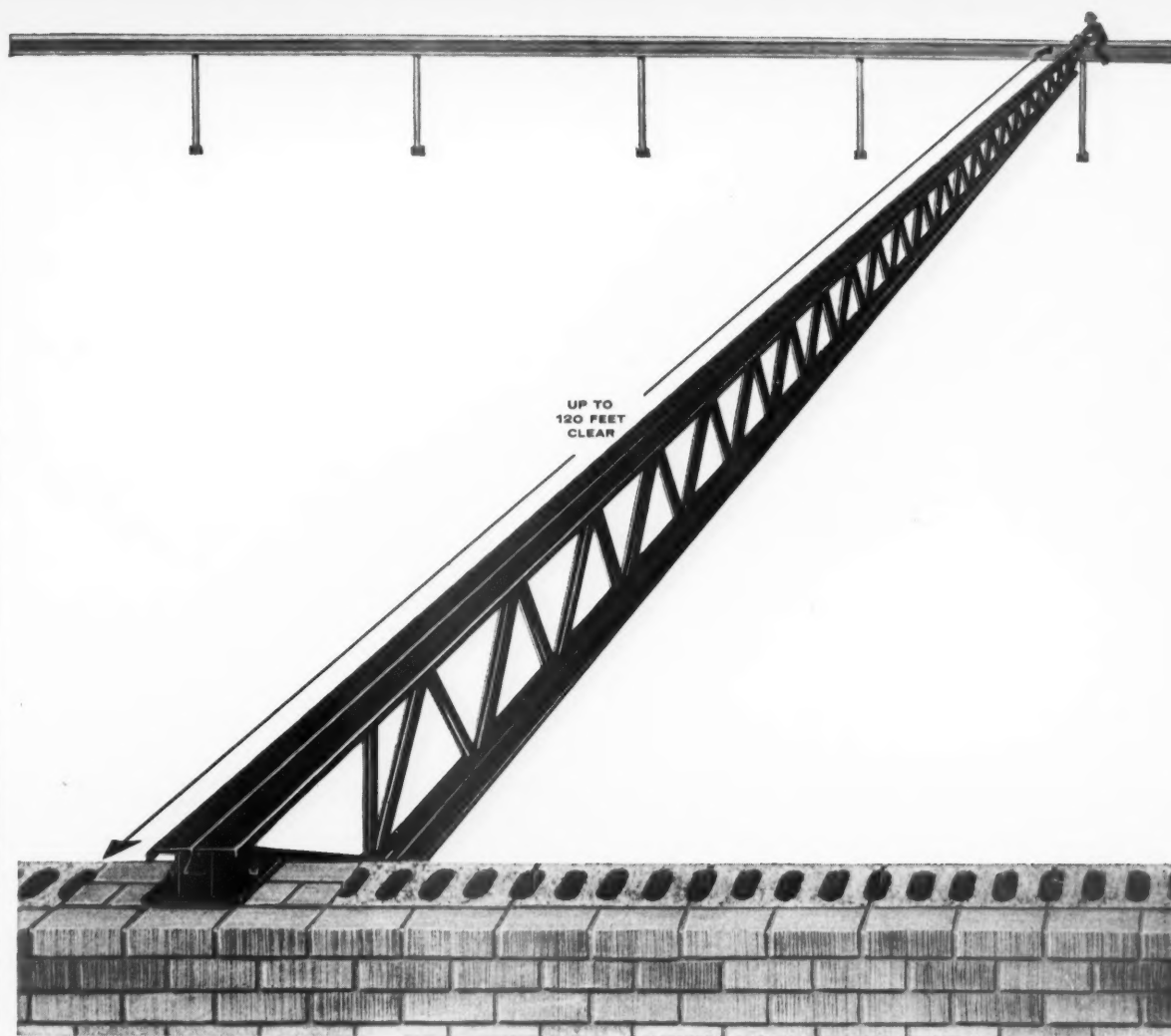
Air-conditioning

There have been cases where the owners of office or loft buildings have provided only a condensing water system (cooling towers, circulating pumps, a condenser water piping, etc.)—selling condensing water service to each tenant that wanted air-conditioning and the tenant himself provided the complete air-conditioning plant in his own premises (including even refrigerating machinery).

A typical figure for such an installation might approximate \$3,800 for every 1,000 square feet of air-conditioned floor space, for the mechanical installation proper—with an appreciable addition for supports, cutting and enclosing (pipe shafts, etc.), and electrical connections.

If the building also requires a new boiler plant and a new heating system, this type of treatment might aggregate quite a bit over \$32 per square foot of heated and air-conditioned space. The next "better" scheme is one in which the owners provide a complete central refrigerating plant, selling "chilled water service" to the tenants who then provide their own "air handling systems." The refrigerating plant itself may be either electric motor driven refrigerating compressors, steam turbine driven centrifugal

(Continued on page 28)



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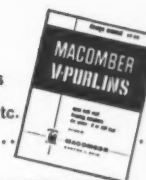
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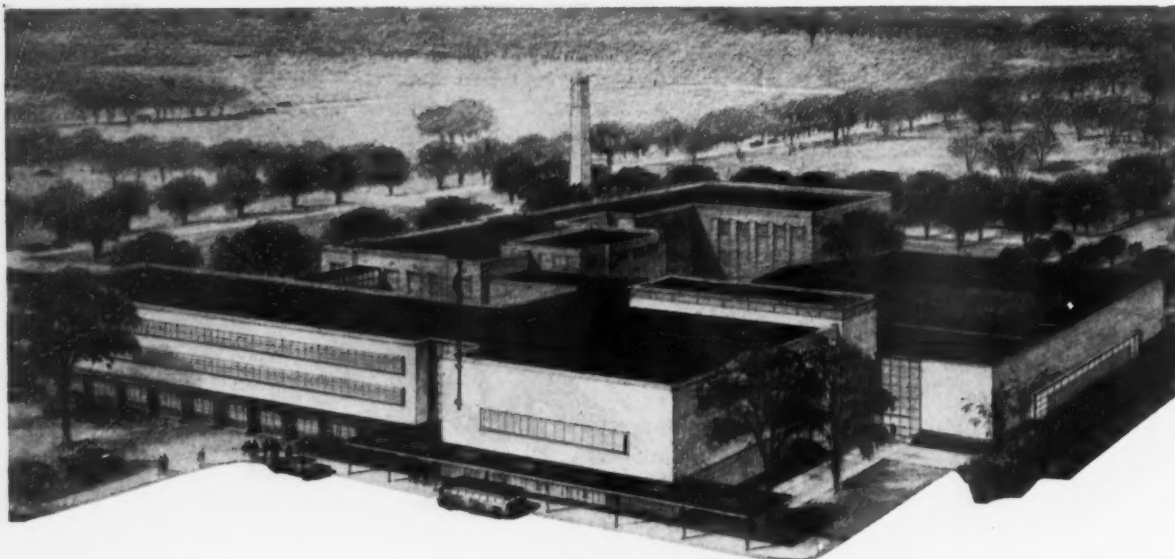
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BUILDING MODERNIZATION

(Continued from page 27)

compressors, or a steam operated absorption plant—depending upon the particular conditions.

A typical figure for the mechanical installation alone, in such a case, would be about \$2 per air-conditioned square foot of space, to which again must be added an item for the provision of mechanical spaces, structural supports, electrical connections, etc.

If this type of installation is to be combined with a new boiler plant and heating system, the total investment may be in the vicinity of \$3 to \$3.50 per square foot of air-conditioned space.

Both of the two schemes just discussed are really applicable only to office buildings or loft buildings and the like. Tenants of apartment houses or hotels can hardly be expected to install their own air-conditioning systems (or at least, would not consider a building in which this was necessary a very modern or desirable building).

Apartment houses

Load conditions are quite different in apartment houses, in office buildings and the like. Tenants take vacations in summer; many apartments are practically empty and with all lights off during the hottest hours of the day; rooms that may be figured for some considerable population (when a tenant has a dinner party or cocktail party, for example) will not all be in use at the same time, in all the various apartments of the building.

All of this adds up to the fact that the "diversity factor" will be materially lower, in an apartment house, than for the relatively constant and fairly full occupancy of an office building (during business hours).

In the apartment, every individual conditioned room must have the capacity to take care of that room's "designed load"; but at any one time, the central plant will probably not have to supply more than about 1/2 as much capacity as the sum of the maxima for all the individual rooms.

This is under maximum conditions of weather and sunshine; these of course will be reduced, part of the time, for all types of building—but in the apartment house (unlike the office building), the heaviest concentration of population and lighting loads may well come when the greatest heat of day and most of the sunshine are past.

Another factor of difference is that a smaller part of the gross area in an apartment house will be air-conditioned, than in most of the other types of buildings considered. Not only will this include halls, stairways, and elevator shafts, and the like—but also the considerable proportion of space devoted to kitchens, bathrooms, closets, and store rooms.

To effectively air-condition the kitchen is still considered uneconomic; occupancy of the bathroom is too intermittent (and if it has exhaust ventilation, it will be at a temperature approximating that of the bedroom, anyway); and closets normally do not contain people or lights, or receive sunshine.

For all these reasons, the cost of air-conditioning apartments is, generally, lower per usable square foot, than for office buildings. A typical set of figures for the "mechanical installation" (using central chilled water supply with a fan coil unit in each conditioned room—a system that is just beginning to replace cruder ones in new apartments) might be about \$2.50 per air-conditioned square foot—which would be hardly \$2.00 per square foot of rented

apartment space, and not very much more than \$1.00 per square foot of gross building space. Again, these figures do not include construction work or electric connections.

If the building is one in which a new boiler plant and a new heating system are required, the aggregate mechanical figure (still exclusive of construction and electric connections) might approximate \$4.50 per usable square foot of apartment space.

From the viewpoint of decent "modernization," this paper does not consider the case of heating only—leaving the tenants to put "self-contained window units" in those rooms which they think they must condition. However, a compromise between this and the better system described above would be an installation in which "self-contained" units are provided by the landlord, systematically, for all air-conditioned rooms, using units of a type which have separate heating coils connected to the steam piping of the building, and which can be operated to provide winter heating (with a small amount of ventilation) as well as summer cooling.

Including boiler plant and steam piping, such a system may be expected to cost something like 80 per cent of the value of the one above-described, for mechanical work, but it will have several drawbacks:

(a) Large openings must be cut through the wall (or formed in the windows) at every room, since such units require much larger outdoor air connections than those supplied with refrigeration from a central plant.

(b) Possible noise and definitely a maintenance problem, for the hundreds of separate small refrigerating machines.

(c) A considerably heavier cost for distributing electric power to the locations of all these units. Whereas the unit connected to a central refrigerating plant may require, for operation of its fan, only about as much power as a good standing lamp, and operate at the same voltage, the units now discussed will require a complete system of separate power wiring.

"Complete" air-conditioning

For hotels and hospitals, the only type of air-conditioning that can be considered is one in which a complete plant (comparable to what would be provided in a new building of the same type) takes care of all requirements for winter heating, summer cooling, and ventilation. Naturally, the same sort of an installation represents the best treatment for an apartment house, or an office building to be modernized.

The scope of this paper will hardly permit description of all the possible systems, but two broad classifications may be considered: The same sort of an installation as would be made for a comparable new building, versus a system in which each floor has its own "air handling system" (zoned as between the different facades and the interior space) with each of the systems supplied with chilled water and steam from central plants in the basement or elsewhere.

This latter scheme has one great advantage (only one floor need be divested of tenants, or seriously

disturbed, at a time for the installation of the air-conditioning), but also a great disadvantage (it is impossible to provide automatic temperature control for the individual rooms, only entire facades can be controlled).

Typical costs for these two types of installation may be approximated as shown in Table II.

As in other cases, the above figures do not include structural work, enclosing, nor electrical connections for power. It should be noted that such complete systems will probably require considerably greater cost for "refinishing" than the partial systems discussed earlier.

Hung ceilings to conceal duct work, new furring around columns to conceal vertical ducts and pipes, new duct and pipe shafts, fan room enclosures, probably new window sill construction to conceal units—all of these will add to the over-all cost of the modernization.

Electrical

General—All wiring and equipment should be examined for corrosion and deterioration. If the structure is less than 20 years old, if the location and capacity of lighting and convenience outlets, generally, are to remain unaltered, and if the original electrical materials were of first quality, it may be reasonable to assume that they will be good for another 10 to 15 years.

However, this will seldom be the case with a major modernization. Higher illuminating levels now desired, changes in desired types and spacing of lighting fixtures, increasing use of electrical office and home equipment, modern requirements for numerous convenience outlets—in apartments the probability of re-partitioning and new room outlets, plus dishwashers, deep-freezers, etc.—all of these will generally make the old wiring inadequate both in scheme and in capacity. In numerous such cases a completely new installation will be needed.

Air-conditioning (whether by the owner or tenant) will certainly require complete new electric wiring.

(a) A complete air-conditioning system will require current for "central plant" equipment and for fan-rooms (wherever located). Central plant demand will vary (with type of building, size of windows, etc.) between almost 3 and about 4 1/2 KW per 1,000 sq. ft. of "air-conditioned space"; the use of steam as the main refrigerating power source would reduce the electric power to perhaps 1/2 KW per 1,000 sq. ft. Depending on the type of "air handling" system used, fan-room equipment may demand from one to 2 KW per 1,000 sq. ft.

(b) With "self-contained" local units power required at the units may approximate 4 KW per 1,000 sq. ft. of air-conditioned space—but with very much more extensive distribution. Fan power (mainly in this case exhaust) will be reduced.

Costs of new electric installation in such modernization program may (very roughly) approximate:

(a) New "general" wiring (for lights and outlets, based on 6 or more W/sq. ft.) approximately \$2,500 per 1,000 sq. ft.

(b) Wiring for "central" air-conditioning (based

on 5 KW/1,000 sq. ft. air-conditioned, including fan room) approximately \$250 per 1,000 sq. ft.

(c) Wiring for "widely distributed" local air-conditioners (based on 4 KW/1,000 sq. ft.) approximately \$500 per 1,000 sq. ft.

Other equipment—The above does not include wiring for new boiler plants, new elevators, etc.—all of which will often be needed. Very roughly, \$500 per elevator and \$250 per boiler (for oil burners, pumps, etc.) may be used as tentative figures.

To all the above (summed up), an addition of perhaps \$250 per 1,000 square feet would be made to cover new "incoming service," switchboard facilities, etc. Telephone wiring and other "signal" work have not been included in these figures.

Plumbing

General—All piping, pumping equipment, house tanks, hot water tanks, plumbing fixtures, and fire protection equipment should be examined for wear and corrosion. If the structure is less than 20 years old and if the basic installation is to remain unchanged in location and if the piping materials are best quality, it is reasonable to assume that the system is good for another 15 to 20 years.

If the fixture locations and therefore the stacks are re-located or augmented with additional stacks then it would be in order to install a completely new installation.

Piping materials—For sanitary and leaders, extra heavy cast iron hub and spigot or Schedule 40 galvanized steel with cast iron fittings.

Water piping—Red brass with cast brass fittings or TP pipe with solder joint fittings in New York City. Other areas, Type L hard temper with cast bronze fittings.

Any existing installation containing yellow brass pipe should be replaced with red brass.

Typical costs—New bathrooms (in apartment houses) may approximate \$1,000 each. If old fixtures can be retained throughout, complete new piping may approximate \$250 per "stack" per floor. In office buildings, complete new piping may run \$700 to \$900 per 1,000 sq. ft. net.

Elevators

Almost all new buildings, today, are equipped with automatic elevators. New building management has a definite competitive advantage over an existing building management, which must meet the ever-increasing elevator operators' payroll week after week.

To meet this challenge, an increasing number of apartment house and office building owners are converting their existing manually operated elevators to automatic operation. Since this change to automation frequently requires the change of the present hoistway doors, car enclosures, hall signals, etc., many building owners and managers are using the elevator construction period to modernize main building entrances and elevator lobbies.

In the development of elevator modernization plans, certain basic procedures should be followed in order to insure an over-all economic approach:

(a) The performance of the present elevator plant should be measured against the building demand. This can be readily performed by field surveys and traffic counts. This information is required in order to determine the number of elevators which should be modernized to provide good elevator service. Modern elevator supervisory systems, with improved floor-to-floor performance, have increased the efficiency of today's elevators so much that—if a building requires improvement in elevator service—it

(Continued on page 30)

TABLE II—APPROXIMATE COSTS FOR A.C. INSTALLATIONS

\$/1,000 Sq. Ft. Net Usable Space	Office Building	Apartment	Hotel
(a) Complete A.C. "Floor-by-Floor"	4,500.	3,500.	5,000.
(b) Complete A.C. "Peripheral & Interior Zones"	5,500.	4,500.	6,000.
A.C. (a) plus Boiler Plant & Steam Service	4,950.	4,075.	6,150.
A.C. (b) plus Boiler Plant & Steam Service	5,950.	5,075.	7,150.

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BUILDING MODERNIZATION

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TABLE III—Sample cost analysis of elevators

Apartment House:	
Assume 14-story building	
2 elevators—2,000 lbs. at 250 ft./min.	
Modernization cost—Approximately \$30,000 per elevator	
Total for 2—\$60,000.	
Office Building:	
Assume 26-story Office Building	
6 Low rise elevators—2,500 lbs. at 500 ft./min.	
6 High rise elevators—2,500 lbs. at 800 ft./min.	
Modernization cost—All new except machines	
6 Low rise elevators—\$70,000 each	\$420,000.
6 High rise elevators—\$85,000 each	510,000.
Total	\$930,000.

will be obtained as a by-product of the elevator conversion.

If the present elevator system is providing good service, it is probable that the number of elevators can be reduced, if made automatic. The vacated elevator hoistways could be used for air-conditioning (for which they may provide vitally needed space) or for new ac electric feeders, or they could be returned to rentable area.

(b) One of the most difficult problems facing the owner or agent (when he makes an elevator conversion) is the determination of which components—if any—of the existing elevator plant can be economically reused. There is no "general" answer to this problem, but the final decision should be guided by the following considerations:

(1) Type and condition of the existing equipment.

(2) Present and long-term plans for the building.

(3) The decrease in elevator performance which may occur if existing components are reused. For example, it may be determined that an existing bank of six elevators could be replaced with five modern efficient elevators. If however, it is decided to reuse some of the present components (in order to reduce the elevator unit price), the efficiency and dependability of the installation may be reduced to the point where six elevators are still required to provide adequate elevator service.

It frequently is more economical to eliminate the long-term depreciation in the elevator equipment while the elevator is immobilized and the elevator constructors are on the job.

The effect the elevator conversion may have on associate trades is as follows:

(1) The steel framing and columns surrounding the elevator hoistways should be checked to determine whether they can withstand the increased loads frequently encountered with automatic elevators.

(2) The existing elevator feeders should be examined and tested to determine their adequacy for the modern elevator system.

(3) A check should be made of existing ventilating systems in the motor generator and machine rooms for performance, or new ventilation methods planned if none are existing.

(4) Existing machine room spaces should be examined to determine whether sufficient space is available for new control equipment.

(5) The associated construction work required in connection with elevator work should be determined.

Where these procedures have been followed, the resulting elevator modernizations have proven to be very satisfactory and public acceptance has been excellent.

by C. S. Whitney, B. G. Anderson and E. Cohen*

The design and disposition of structures to resist atomic blast are potentially ominous elements of urban planning. The following paper (from which the appendices have been omitted) was originally prepared in an enlarged form for the Office of the Chief of Engineers, Department of the Army, and includes only unclassified material. It is given here through courtesy of The American Concrete Institute, where copies which include the appendices are available.

Introduction

Following the development of the first atomic bomb, our government initiated an extensive research program to determine how atomic bombs could be used to greatest military advantage, and, conversely, whether we could protect ourselves from their effects if used against us. Following the cessation of hostilities in Japan, survey teams from many countries probed into the rubble of Hiroshima and Nagasaki for statistical information about the damage capabilities of the first bombs. At the same time intense research programs were initiated to determine by theoretical analyses and physical tests how particular structures would behave under blast loads. In many respects, these programs probably exceeded the scope of any single previous research program on building construction. The data accumulated in these tests have furnished useful information on the behavior of structures and materials under all types of loads, including atomic bomb blasts.

The results of the research programs and the data from the Japanese incidents indicated the high vulnerability of present buildings found in American cities if subjected to atomic attack. However, it was also demonstrated conclusively by full scale tests that structures can be designed to resist the effects of atomic explosions.

Consequences of an atomic attack

The grim records of the Japanese incidents indicate¹ that up to 95 percent of the people within a radius of $\frac{1}{4}$ mile, 88 percent within $\frac{1}{2}$ mile, 72 percent within $\frac{3}{4}$ mile, and 55 percent within 1 mile might be killed as the direct result of an explosion of even a nominal (20 kiloton) bomb unless adequate shelters or warning are provided. Each of the two Japanese cities subjected to the burst of a single atomic bomb was devastated to such an extent that, despite conventional air-raid precautions, most of the uninjured and slightly injured found the disaster more than they could endure and fled panic stricken, leaving the cities with the dead and more seriously injured unattended. Useful productivity ceased for many months and both cities lapsed into a coma for the remainder of the war. Because of these results and the greatly increased capabilities of atomic and thermonuclear weapons since developed, blast resistant protective construction has become a subject of critical importance to the nation and of major concern for structural engineers.

* The late C. S. Whitney was Partner in Ammann and Whitney, consulting engineers. B. G. Anderson and E. Cohen are respectively Partner and Associate in the firm.

That weapons so powerful that an entire city can be laid waste by the detonation of a single bomb are available in quantity is a sobering thought.

The question arises whether total destruction is inevitable in an atomic war or whether measures can be taken to alleviate this possibility. One suggested solution is dispersal of buildings and population. As even the largest bombs have a limit in radius of destruction, such dispersal would reduce the damage resulting from any given explosion. This solution, however, would have had more chance of success if the bombs had remained at the relatively low energy level of those used in Japan, where severe damage was limited to a relatively small area. If dispersal were used as the only means of reducing the damage capabilities for present and future weapons, cities as we now know them would disappear, resulting in new, and perhaps insoluble, problems of daily transportation, communication, and production.

An alternative protective measure would consist of combining limited dispersal with an increase in the average blast resistance of structures in metropolitan areas. This approach would necessarily be limited largely to new construction, but at the normal rate of obsolescence and reconstruction, and by proper planning of much needed expressways and public works, much could be done to improve our future chances of survival. To make this solution possible, adequate technical data must be available to civilian engineers and means must be found to encourage its use.

Air blast effects

The three most important phenomena associated with an above ground explosion of an atomic bomb are air blast, thermal radiation, and nuclear radiation. Radiation phenomena are not involved in the determination of the required structural strength though these effects must be considered in the design of structures intended to offer protection for personnel. Such structures must have sufficient thickness of material between the occupants and the source of the radiation to reduce the intensity to a nondangerous level. Also, it is important that the structure be designed to minimize the fire hazard resulting from thermal radiation. However, in designing protective construction, the dynamic loading caused by the air blast pressures is of primary concern. The character and cost of construction suitable for resisting these blast pressures will depend on the purpose of the structure and on the nature and magnitude of the assumed blast load.

Loading, damage, protection and cost

1 Above ground structures

It is obvious that the exact loading (depending on the actual energy level of the bomb and the location of the burst) to which any particular building may be exposed will never be accurately known except for buildings tested under controlled conditions. Any attempt to estimate a load based on possible enemy capacity and accuracy would appear futile. Even if a reasonably accurate estimate could be made of enemy capacity considering present day weapons, it would probably be obsolete in the near future due to the further development of atomic and thermonuclear bombs and of the methods of delivering the bomb to the target.

However, it is possible to arrive at more practical design criteria by studying the effects of various degrees of energy release on structures with varying degrees of resistance. The merits of providing or

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DESIGN OF BLAST RESISTANT CONSTRUCTION FOR ATOMIC EXPLOSIONS

DESIGN FOR ATOMIC EXPLOSIONS

(Continued from page 31)

not providing protection against forces due to different energy levels can then be made to suit the best advantages of both the community and the individual client.

At some distance from ground zero (the point on the ground directly below the exploding bomb) the weakest of conventional construction will withstand the blast pressures, this distance varying with the height of burst and the energy release of the bomb.

At some radius from a given burst the weaker of conventional buildings would be totally destroyed. Others of greater strength would stand and offer protection up to another shorter distance from ground zero. This estimated area, based on extrapolating the effects of the Japanese incidents, might range from approximately 4 sq miles for a 20-kiloton bomb to an estimated 400 sq miles for a 20-megaton bomb. There is no reason to expect that average buildings in the United States (other than residences) would offer a resistance superior to those in Japan where many buildings were designed for heavy earthquake forces. The area within which severe damage would occur in the stronger buildings can be substantially reduced by even slight improvements in the best present conventional construction. As protective features are added to make the area of damage smaller, cost of the added protection increases rapidly as shown by the cost-distance curve of Figure 1A.

This curve is based largely on the results of a cost study prepared to illustrate the estimated increase in cost of construction of an eight-story reinforced concrete apartment building 51 ft wide. Shear wall or box frame construction was substituted for conventional framing at the closer distances because much greater costs and permanent deformations would have resulted from the use of beam and girder or other conventional types of construction. The cost-distance curve and the damage area curves plotted in Figure 1B indicate a typical relationship between cost of construction and increasing degrees of protection, and can be used as a guide for comparing cost of protection versus reduction in damage.

Protection beyond that provided by nominal improvements in the details and arrangement of improved conventional construction involves an increase in cost which may be difficult to justify. If more and more protection is provided, a point will be reached where the cost of adding protection to all buildings over a large area will be greater than the value of the property which could be saved in case of bombing. Investments of this magnitude would obviously be impractical as they would result in an economic loss either with or without enemy action.

However, within these two limits, i.e., the low degree of protection offered by the weaker types of present day construction and the much higher degree of protection obtained at exorbitant costs, is a possible range of protection well worth considering.

The practical limits of protection for any given building depend on many factors such as the type of construction, its functional use, its strategic value, and its location relative to strategic targets. For example:

Certain types of building construction can be given a great deal of protection at little cost and consequently will be more readily converted to pro-

TECTIVE designs than others.

Buildings erected for investment purposes presumably will not command increased rents unless the contents and personnel as well as the building are protected.

The government has an interest in protecting lives and maintaining operations at least in certain strategic buildings in the case of emergency even at a high cost.

In general, single large bombs may be used to destroy well defined strategic targets while the damage caused by more numerous smaller bombs used for general destruction of a metropolitan area would be limited to relatively small areas surrounding each burst. This fact along with information on the population and production distribution permits the necessary studies of probable target areas.²

2 Underground Structures

Underground structures³ have certain advantages in resisting the blast effects of an air-burst atomic bomb. The earth fill over semiburied structures presents a more favorable silhouette to the passage of the shock front, thus minimizing multiple reflections and attendant pressure increases. Structures which are entirely below the ground surface are even better in this respect. The earth cover also absorbs some of the force of the blast although the amount of protection varies with the type, density, and moisture content of the soil. In most instances earth may be used to gain additional protection at minimum cost.

Entryways should be arranged to shield the interior from direct nuclear or thermal radiation, particularly if there are no doors. This may be accomplished by one or more right angle turns, by making the entry passageway normal to the shelter entrance, or by constructing a passageway completely through the fill and open at both ends, thus avoiding a dead-end trap or pocket. In the latter use, the entrance to the shelter would be at the center of and perpendicular to the passageway.

Evaluation of blast force

Most of the energy released by atomic fission acts to heat the surrounding air to extremely high temperatures. The rapid expansion of this heated air exerts an enormous pressure on the surrounding atmosphere which moves outward from the center of the explosion as a conventional shock wave. This wave is characterized by a virtually instantaneous rise to a peak pressure which quickly decays in intensity to atmospheric followed by a much less intense negative pressure phase. The intensity of the peak pressure, the variation with time, and the duration of the positive phase are of prime interest to the structural engineer. These factors depend on the energy release of the weapon, the ground zero distance, and the height of burst (Figure 2). Design to resist blast loads is complicated by the fact that it is the combination of duration and the peak intensity which determines the destructive effects of the explosion. For example, brick walls of thicknesses that were found to be effective in resisting certain short duration pressures caused by high explosives in England have collapsed in Japan at appreciably lower pressures under the longer duration of atomic blast. This behavior can be easily verified by simple calculations. It is therefore necessary, to produce a well balanced design, to have a reasonably reliable estimate of both the intensity and variation with time of the blast loads caused by nuclear explosions.

Once the energy level to be protected against is established by the selection of an appropriate bomb

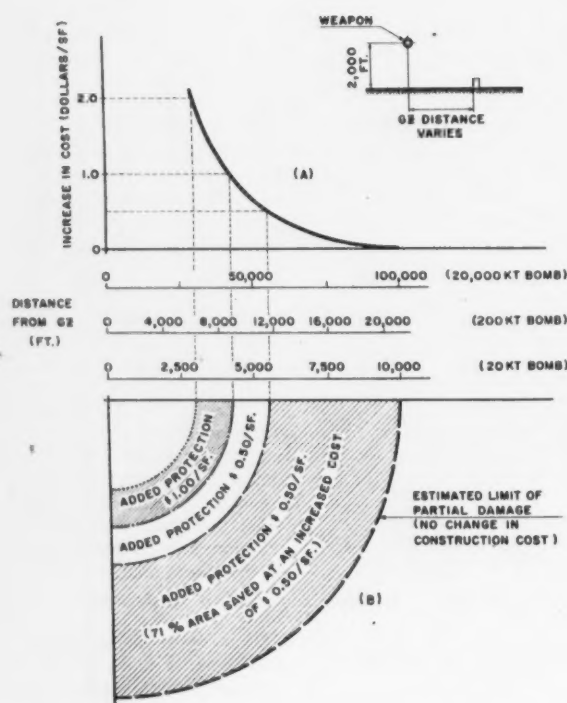


FIGURE 1. Increase in cost versus ground zero distance for a typical multi-story building.

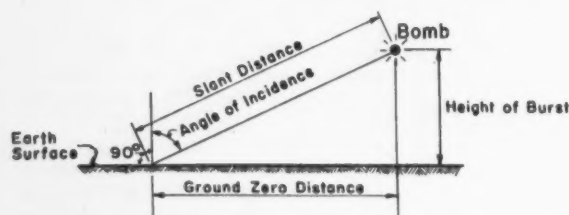


FIGURE 2. Air burst geometry.

and ground zero distance, the impulsive loading curves for most types of rectangular structures may be approximated through methods worked out by us. These methods assume that the pressure intensity reaches its peak value instantaneously and then decays to atmospheric at the end of the positive phase.

Structural analysis for blast loading

The analysis of structures subject to impulsive loads consists of applying the load to a structure and then determining whether the structure possesses sufficient strength to carry the applied load without failure. For conventional static loads, it can be assumed that the applied load and the internal forces are closely balanced at all times and that the acceleration is negligible. Stresses and strains of the loaded member can then be computed on the basis of static equilibrium by equating the resisting forces, acting at allowable stresses, to the design loads.

In the case of rapidly or instantaneously applied loads, the internal forces resisting deflection will not be immediately and continuously equal to the applied loads and the resultant acceleration of the member or parts of the member will not be negligible. Furthermore, the load may be of such short duration that the static strength of the structure may be less than the peak applied load without danger of failure. The maximum stresses and, more important, the maximum displacement, produced under blast loads are a function of the intensity of the applied force, the rate of application of the force, the duration of the load, and the particular variation with time of the applied force and the resistance. These stresses and displacements are generally far different from those which would result from a static load of equal magnitude.

Dynamic loads of the type described above are usually of a secondary nature in conventional design and are covered by the use of impact factors. However, even in conventional design, it is often necessary to make a rational determination of the amplitudes of the transient vibrations caused by reciprocating or rotating machinery or by earthquake displacements. Similar procedures can be used for blast resistant design.

An empirical design of a structure to resist an explosion could, of course, be attempted by making the building conform in strength to buildings that have withstood similar blast loads. This procedure would not be effective, however, if the building being designed varied slightly in shape, orientation or wall openings, mass, or in the type and number of resisting members, all of which would affect the loading and the structural resistance to the loading. Nor does the fact that the prototype building resisted the blast tell whether some or all of its parts were stronger and consequently more expensive than necessary. For such reasons it is desirable to use analytical procedures that permit the design of buildings for specific degrees of resistance.

The analysis consists of applying the forces to the structure and calculating the relative motions or strains caused in the various members by these loads. As in any dynamic solution, the problem becomes a question of force, mass, stiffness, strength, and time. For the simpler cases where both the load and the resistance can be represented by simple mathematical expressions, analytical solutions are available. For most practical cases, however, the load is erratic in intensity and the resistance of the members is complicated by variations in internal

(Continued on page 34)



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DESIGN FOR ATOMIC EXPLOSIONS

(Continued from page 33)

resistance and by motions of the supporting parts and it is advantageous to use numerical solutions. Besides offering a means of solution, the numerical methods are equally useful for providing a sequential picture of the action of the structure.

Other factors

Yield, sliding, or other movement of the supports of beams, slabs, or wall members exposed to the blast forces or the motion of the footings that restrain the building frames from sliding or rotating will act to relieve the straining parts and must be considered in the design. A similar and very important effect is shown by the behavior of buried structures, an effect too important to be ignored because of difficulty in understanding its true action.

This behavior can be anticipated in the design by assuming that the earth acts as a heavy elastic medium in the transmission of the impulse to the buried structure. The pressures acting on the structure are therefore a function of its stiffness, mass, and resistance. The initial acceleration of a flexible member may be so large that the initial impulse applied to the deflecting buried members is reduced in intensity in critical areas (such as at midspan of a beam or slab) and extended in duration thus reducing the damaging effect of the impulse. The weaker and/or more flexible the buried member, the greater the initial acceleration and the greater the relief.

As the resistance of the structure would have to be computed not once, as in conventional design, but in each of the successive time intervals, such analyses would appear to be extremely tedious when applied to the analysis of frames or other complicated structures. However if plastic motions are permitted, and such motions are usually needed to absorb the applied energy economically, the analysis is simplified by the formation of plastic hinges which make the structure statically determinate. As a result, the cost of a dynamic analysis may be only a few times that of a conventional analysis while the cost of the drafting will not change. Detailed methods of analysis are given in Appendix 2 of the original report, but are omitted here.

STRUCTURAL DESIGN

General

Structural members must develop an internal resistance sufficient to stop all motion within the limits of strain prescribed for the particular design. These limits may be determined by (1) the minimum strains which would cause complete collapse of the structure or (2) the permanent strains that will not prevent continued use of the building for its intended purpose. In conventional design, stresses are maintained at some fraction of the yield stress and the structure or member returns to its initial position after the load is removed. For blast resistant structures, the load capacity depends on the peak strength developed by the member and on the ability of the member to sustain its resistance for a specific though relatively short period.

It is obvious that design by the usual method of allowable stresses will not indicate the ultimate impulsive load capacity of the structure. The energy absorbing capacity at yield will be four or more times the capacity at working stresses and that at failure may be 40 to 60 times as much.

Flexural members

The peak strength that can be developed at any section of a beam or frame can be determined easily

by methods described in previous papers.⁴ For a simply supported or cantilever beam the flexural resistance will increase until yield is reached at the critical section of the member. If the member is strained further, a plastic hinge will form at this point, and the resistance will remain approximately constant for strains within the limits described previously. If the beam is restrained at the ends, the resistance will build up at a rapid rate until yield is reached at the first critical section, then will increase at a slower rate until yield is reached at the other critical sections, after which the resistance will remain essentially constant until failure occurs. Prestressed members will act in a similar manner except that they will have a shorter plastic range and will absorb less energy than members designed for the same loads using conventional steel.

The resistance of rectangular frames to lateral loads can be measured by the sum of the moment capacities at the top and bottom of the vertical members or by the strength of the horizontal restraining beams, whichever is weaker.

The load capacity of slabs is more difficult to estimate, but can be approximated by use of failure-line theories. By use of these theories the motion of slabs can be expressed as motions of simple triangular or trapezoidal shaped elements having shapes determined by lines of constant moment formed by yield in the slab. The strength and effective mass of these simple elements can be obtained easily. Having the total moments required by the external forces acting on these elements, the distribution of moments and arrangement of the steel can be made in accordance with recommended practice of the American Concrete Institute.

Limits of strain

The maximum strains that can be tolerated in a structure after the blast will, of course, depend on whether the protection is intended solely to save the lives of the personnel or whether both lives and the structure are to be preserved. If the structure is to continue to serve its intended function after the blast, then it should not be damaged to the point where subsequent exposure to the elements or normal working loads will cause an early failure of the building. It might normally be expected that this criterion would allow only small plastic strains in concrete members and that possibly structural steel framing might be more suited to construction, permitting large strains. Actually, the experience gained in the structure tests referred to in this paper has proved that concrete members are capable of absorbing dynamic strains as large as are likely to be economically advantageous. These structures have withstood severe shocks without showing an alarming degree of damage.

However, if the structure is to remain usable or readily repairable, it should not be deflected or distorted enough to prevent operation of cranes, elevators, and other equipment.

It has been demonstrated by laboratory tests of simple structural members and by full scale tests of several test buildings that deflections up to $\frac{1}{32}$ of the clear span can be tolerated in beams having 2 percent or less reinforcement. Columns can sustain deflections of similar magnitude.

The effect of such large strains on the members are of particular interest. Reinforced concrete columns, after being strained to maximum transient displacements of that order in full scale tests, were cracked, but they were so sound that the first reaction of observers was that the expected large deflec-

tions were not experienced. This feeling was dispelled by the surveys.

Strength of materials

Virtually all members in a structure subject to blast loads will be subject to forces causing both direct and flexural stresses. Because conventional design methods do not permit a reasonable estimate of member capacity under such combined loads, ultimate strength design methods must be used to predict the behavior of these members. However, to accomplish major designs requiring the services of a large office staff unacquainted with plastic theory, it is possible to derive sufficient data from a limited number of ultimate designs to prepare equivalent static load charts or tables to permit the general use of conventional procedures in particular design cases.

To make an accurate estimate of the strength of a structure, it is also necessary to estimate the maximum usable stresses of the various construction materials. On the basis of numerous standard tests, it may be expected that structural steel will have an average yield strength of about 40,000 psi and that intermediate grade reinforcing steel will have an average stress at yield of 50,000 psi. Except where shear and bond control, the concrete strength for under-reinforced flexural members is not important as variations in the concrete strength have only a slight effect on the lever arm and moment capacity of the member.

Where the rate of strain is sufficiently high, the dynamic yield stress of most materials is substantially increased above the standard test values.

Verification of design methods

Because analytical and design procedures, however logical, are always subject to doubt until verified by tests, a full scale structures test program was prepared by the Office of Chief of Engineers, Department of the Army.

The test buildings were designed by estimating the expected pressure loadings from the proposed energy level of the test bomb and then designing the various structures to withstand these forces with a specified maximum and a specified permanent deflection. Pressure, velocity, acceleration, and displacement gauges at critical points provided continuous records of the actual blast loading and the response of the structures with respect to time.

The tests included typical examples of many of the structural materials and types of framing used in conventional construction.

Flexibility, mass, resistance, and redundancy of the resisting members were varied in the different structures to widen the range of construction to which the test results would be applicable. The data also permitted a direct study of the effects of atomic weapons on a wide variety of members and materials common to conventional practice. The structures which were studied and tested ranged from individual members and underground shelters up to full scale three-story rigid frame, shear wall and cellular above-ground buildings, including foundations, curtain walls, and floor and roof systems.

The structural behavior experienced in these tests is indicated by the maximum recorded displacements at the roof level of two windowless three-story buildings, one framed in steel and the other in concrete. The displacements at these points were within 20 percent of the values predicted by design computations. This consistency between computed and observed values, which was similar to the results obtained in other parts of this test for widely

varying types of buildings, shows that structures can be designed to be adequate to withstand a given impulsive load with reasonable accuracy.

Radiation and fire protection

Radiation⁵ from atomic explosions is essentially of two types, *thermal* and *nuclear*. Protection against gamma rays, which constitute the most important type of nuclear radiation, is achieved by interposing shielding of sufficient mass and thickness to absorb and reduce the intensity of the radiation to less than the lethal dosage. Neutrons and alpha and beta particles are also emitted but are usually less dangerous.

Approximately one-third of the energy of an atomic explosion is released as thermal radiation. The distances in miles at which certain total thermal energies are delivered are given in Table I as they are affected by yield and visibility.⁶ The total radiation (thermal or nuclear) at any given distance is directly proportional to the bomb yield, i.e.,

$$\frac{Q_1}{Q_2} = \frac{W_1}{W_2}$$

where Q = total radiant energy

W = equivalent total energy yield of explosion

Surveys of the bombed Japanese cities showed that crops and other vegetation were completely burned out as far as 1000 yd from ground zero. Trees were fired, apparently by flashburn, up to 1½ miles⁷ and buildings in both Japanese cities were badly burned including many concrete buildings otherwise undamaged and of a type normally not subject to fire.

Table I

Distances in miles at which certain total thermal energies are delivered related to yield and visibility:

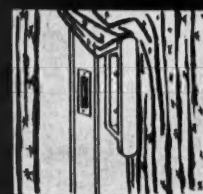
Energy release	Visibility 4 miles	
	3 cal per sq cm	10 cal per sq cm
20 kt	1.3	3.8
100 kt	2.2	1.5
1 mt	3.5	2.7
10 mt	4.8	4.0

	Visibility 35-40 miles	
	3 cal per sq cm	10 cal per sq cm
20 kt	2.2	1.3
100 kt	4.3	2.8
1 mt	10.0	6.8
10 mt	17.0	13.0

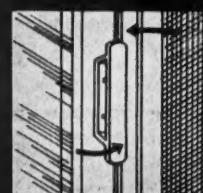
It was demonstrated by these experiences that a large number of primary and secondary fires may occur simultaneously and that a firestorm is likely to develop in any high density area made up of inflammable buildings. People within such an area are likely to perish by suffocation if not from blast and burning. In view of this, methods of preventing and combating fires and limiting the spread of fires should be considered with the same degree of concern as is devoted to blast resistance.

Disastrous fires of the type described are most likely to occur in congested slum areas. The obvious first step is to clean out these areas, to substitute less congested and less flammable construction, to provide adequate firebreaks for prevention of fire spread, and to provide ready access in and out of the stricken areas. These over-all steps are desirable and needed in most cities regardless of peace or war. Individual fires may be initiated by spread from

(Continued on page 36)



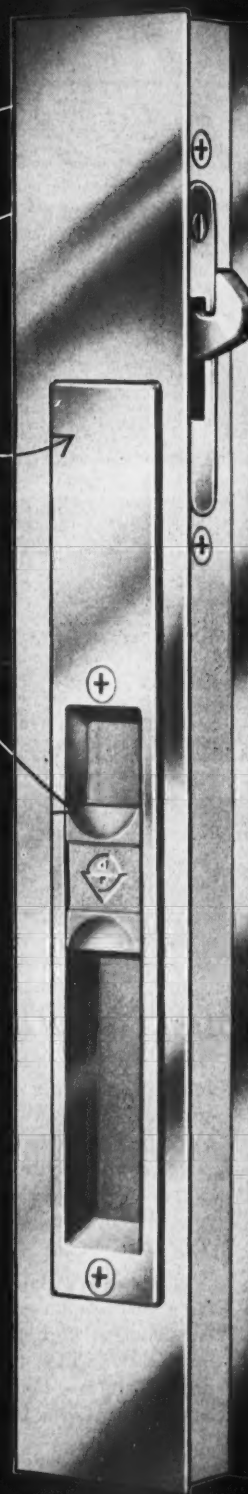
NO surface hand pulls to tear or catch draperies or blinds.



NO surface hand pulls to prevent the by-passing of other units.



NO surface hand pulls to prevent complete retraction of doors into "pockets."



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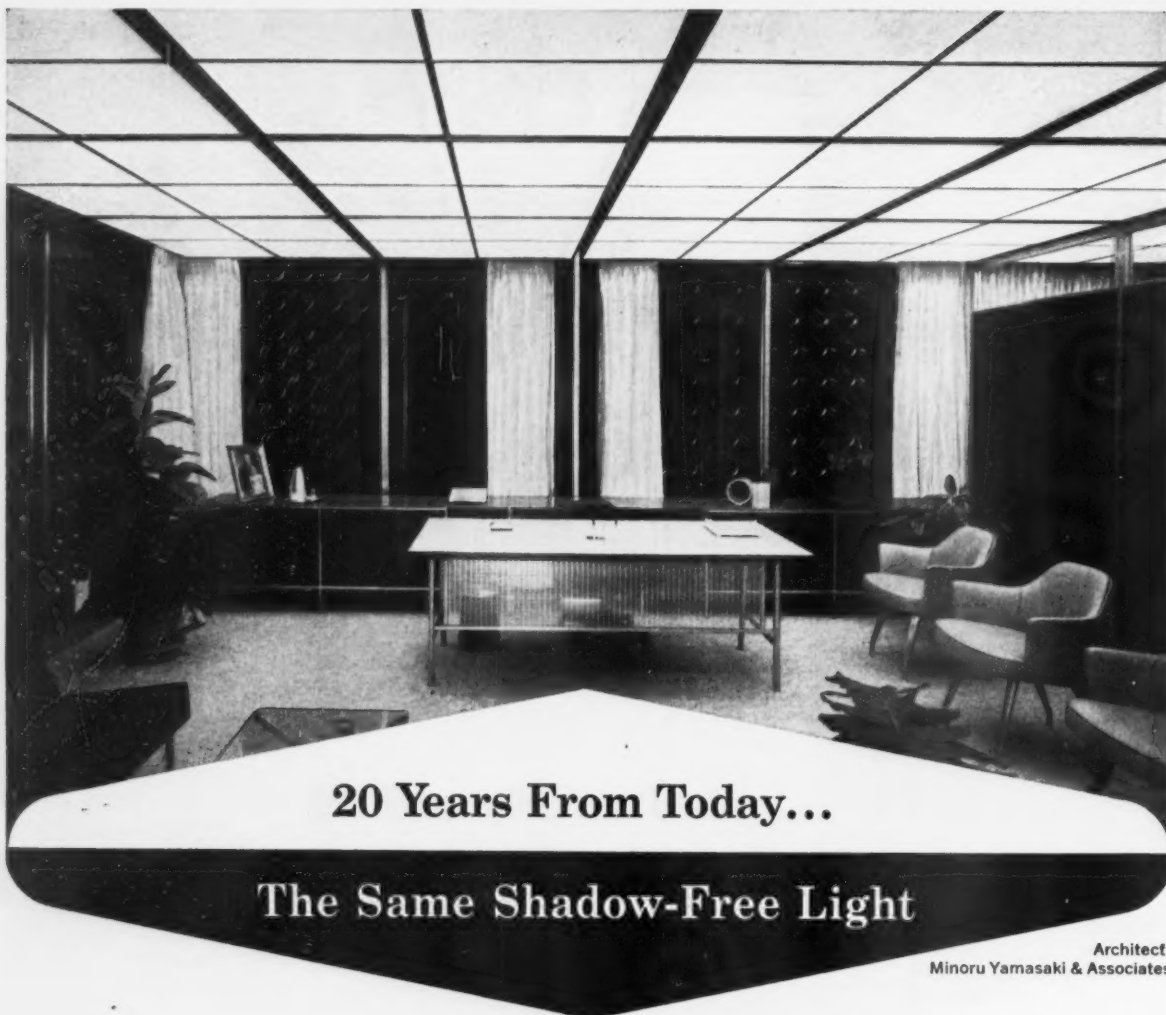
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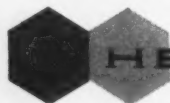
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DESIGN FOR ATOMIC EXPLOSIONS

(Continued from page 35)

adjacent buildings, by damaged appliances, by convection from heated air, and by radiation, the bulk of the fires being caused by the intense initial heat radiation from the bomb flash.⁸

Methods of preventing and fighting the individual fires, beyond dispersing the buildings and providing fire lanes and access routes, are the same as those used in limiting and preventing peacetime fires. For example, fireproof frames and enclosures help prevent the spread of fires both from the outside and inside of the building and thus help gain the time needed to fight the localized fires. Quick acting circuit breakers for the electrical systems and street shutoffs for gas help prevent and control fires caused by damaged appliances. Wherever possible buildings should be of fireproof construction and should contain a minimum amount of combustible materials. Good housekeeping practices with respect to avoiding accumulation of waste paper and other kindling materials will greatly reduce the hazards of fire.

However new factors are introduced. Sprinkler systems, for example, normally so effective against peacetime fire hazards, may be inoperative in the case of atomic blast due to water supply failures unless a separate static water supply with protected supply lines to the building system is available.

In spite of the obvious difficulty of providing complete fire protection, it is encouraging to note from the Japanese experiences that fireproof buildings with window openings covered by shutters were not ignited by radiation, damaged appliances, or intense surrounding fires even though the shutters were blown off as soon as the shock front reached the building. It would therefore appear that much can be done to limit fire damage by use of the same materials and types of construction that are effective in limiting blast damage.

Footnotes

1 The Effects of the Atomic Bombs at Hiroshima and Nagasaki, Report of the British Mission to Japan (1946), Her Majesty's Stationary Office, London, England.

2 Civil Defense Urban Analysis, TM-801, Civil Defense Administration, Washington, D. C.

3 Kirkpatrick, M. D., "Design of Below Ground Structures," Proceedings, MIT Conference on Building in the Atomic Age, June 1952.

4 Whitney, Charles S., "Plastic Theory of Reinforced Concrete Design," Transactions, ASCE, V. 107, 1942, p. 251.

5a The Effects of Atomic Weapons, Los Alamos Scientific Laboratory, U.S. Government Printing Office, Washington, D. C.

b Lampson, C. W., "The Blast and Radiation of an Atomic Bomb," Proceedings, MIT Conference on Building in the Atomic Age, June, 1952.

c Callan, E. J., "Concrete for Radiation Shielding," ACI Journal, Sept. 1953, Proc. V. 50, pp. 17-44.

6 "The Medical Effects of Atomic Blasts," an address by Dr. J. C. Bugher, Director, Division of Biology and Medicine, U.S.A.E.C., on Sept. 23, 1954, at 7th Annual Industrial Health Conference, Houston, Texas.

7 Report of the British Mission to Japan (1946), op. cit.

8 Report of the British Mission to Japan (1946), op. cit.

FALLOUT PROTECTION FOR SCHOOLS

by Milo D. Folley, AIA

Among the many factors involved in the Redesigning of Urban America is the possibility of nuclear war. One aspect of such a war would be defense against radiation. This aspect is discussed in the following article, based on a paper delivered at the last conference of the Building Research Institute. Mr. Folley is Partner, Sargent, Webster, Crenshaw and Folley, Architects and Engineers.

With the development of the atom bomb and the use of atomic fission in commerce and industry we have been aware of a hazard hanging over us. Whether fall-out occurs as an act of aggression or whether it is from accidental release, its effects are just as deadly. The destruction by a direct hit is beyond consideration and one cannot comprehend a means of protection against the heat, concussion and pressure. However, the hazards of gamma radiation brought by fall-out are such that shielding can be provided. Although only 15 per cent of the damage of the blast is radiation, it is this that will offer the most widespread hazard.

It is in the nature of man to procrastinate in regard to his own safety and it is likely that he will not build his own fall-out shelter. However, he may very likely consider how an agency of the government can be used to provide such protection. One such organization is the local school district, providing a substantial, major structure with continuing supervisory personnel, and located geographically with relation to the population load. He will realize that protection of our children is important to the future, psychologically and physically. Consequently, schools become our best areas of shelter.

A study of wind drift charts based on bomb blasts of important targets shows only a small percentage of the country will receive serious concentrations of fall-out. However, due to wind changes, any location may receive a lethal dose, so full protection is the only safe consideration. Our early warning network indicates that adequate "take cover" warning will be given providing approximately two hours warning—enough time to secure school children in a shelter. Confinement may last from several hours to

as long as two weeks.

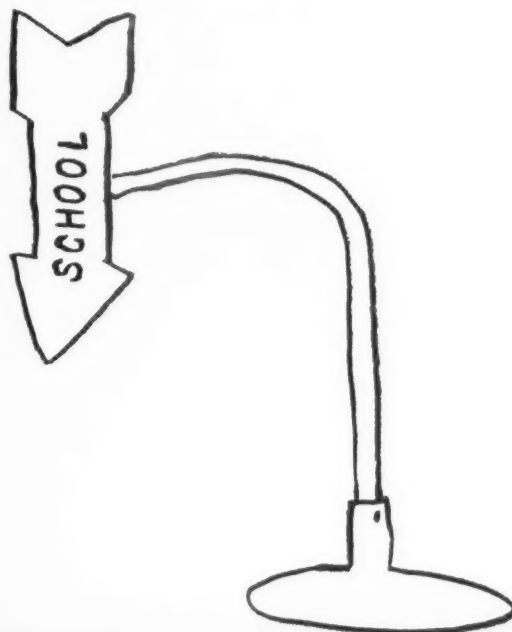
Fall-out is a dust in the range of 15 microns which falls like snow upon all horizontal surfaces, and radiates penetrating gamma rays in all directions. Although the rays diminish rapidly; the initial fall, assumed to be in the vicinity of 3,000 Roentgens per hour, is extremely dangerous.

A shelter must provide a protection factor of 30 or more, being a minimum of 1/30th of the dose per hour that one would receive with no protection. A shelter then must have an interior exposure of less than 100 Roentgens per hour, preferably less than 50, to offer adequate protection. A total lifetime exposure of 700 Roentgens is the assumed maximum that a person can absorb without dangerous effects.

The density and weight of construction materials are the prime factors in protection from radiation. Therefore, a system of construction which best utilizes these properties will offer greatest protection. It is obvious that masonry systems are superior because of their weight-cost ratio. Underground shelters using the protection of the earth suggest greater shielding with least construction cost.

We have found from experience that crawl space construction with flat slab concrete floors is both sensible and economical. This spacious area can be used for mechanical installations, as a moisture and temperature barrier, for random storage, as well as for fans and ducts. With only slight modification portions of this area can be deepened for habitation. The below grade effect offers excellent shielding and the concrete slab overhead, combined with roof and walls above provides a very satisfactory shelter with a hazard of 40 Roentgens per hour, well within the safe limits.

Recently, at the request of a school district, we were asked to consider the installation of a shelter in a new high school. In surveying the plans it was found that for 600 pupils at 12 sq. ft. per pupil, we would require 7,200 square feet to house the entire school population. In this building—of masonry construction with a steel frame superstructure—we can develop adequate below ground space adjoining the boiler room, food storage areas and service areas at almost no additional cost. At this time we shall only



BASIC SHIELDING DATA

Hazard = $\frac{\text{Dose rate}}{\text{Protection factor (P. F.)}}$

Protection factor = $\frac{1}{\text{Reduction factor (R. F.)}}$

12" Concrete }
3 3/8" Steel } 150 lbs./sq ft./ft thickness { Roof R. F. 0.006
2 1/2" Lead } { Wall R. F. 0.03
44" Wood }
18" Earth }

Example
P. F. = $\frac{1}{0.006} = 165.7$ Roof hazard = $\frac{\text{Dose rate (3000 R/hr)}}{165.7} = 18 \text{ Roentgens/hour}$
P. F. = $\frac{1}{0.03} = 33.3$ Wall hazard = $\frac{\text{Dose rate (3000 R/hr)}}{33.3} = 90 \text{ Roentgens/hour}$

ROOF PROTECTION

(Hazard, in Roentgens per hour)	P.F.	Add stone gravel	Add 2" sand
Steel deck	1.67	1800	1680
Organic deck	2	1500	1360
Concrete deck			
(3"+1" insul't'n)	10	300	295
Gypsum deck	8	375	365
			350

WALL PROTECTION

(Hazard, in Roentgens per hour)

	P.F.	
12" Concrete	33	90
4" Brick+8" Block	8	390
8" Block	4	840
Wood frame	1.67	1800
Metal panel	2	1500

FLOOR PROTECTION

(Hazard, in Roentgens per hour)

	P.F.	
8" Concrete	50	60
3" Concrete on bar Joists	10	300
Wood joists	3.3	900

FALLOUT PROTECTION

(Continued from page 37)

excavate the necessary area and leave it unfinished, either for development when the urgency becomes more acute or for immediate but not so comfortable use at once. Entrances are protected and areas have been set aside for first aid, sanitation and emergency power.

Air to breathe

A crucial aspect of any discussion on fall-out protection involves air purification. Outside air can no longer be considered "pure." Outside atmosphere today is dangerously loaded with infectious gases, pollen, bacteria, dirt, and now, fall-out. With today's engineered systems it is more economical to reprocess the air than to take in large quantities of makeup air. Only enough new air is added to provide oxygen and old air is removed to take out the carbon dioxide. In design of adequate school heating systems we try to control air borne infection by cleaning air of its dirt and thereby removing germs attached to dirt particles. We have developed a central air system using an electrostatic self-cleaning filter. Although large quantities of air are moved, minimum intake is controlled, and all air except in toilets and kitchens is recirculated through the filter. A filter which will remove ordinary air dirt will remove fall-out particles. Because of the "hot" or radiant condition of the particles, the filter must eliminate the waste so as not to build up dangerous radiation. This system has been found to be no more expensive than other heating and cooling systems offering similar features, but has the ability to purify the air.

Such a system is ideally suited for fall-out shelters. In the already mentioned school the air system is planned to be diverted to the shelter area for emergency use. An emergency standby generator can be used to power the unit as well as for lighting. These generators can be often secured by the school from government salvage on a 50-50 basis. These two construction features are by themselves the major factors in providing a fall-out shelter. Such other amenities as food, water, sanitation and first-aid can be provided with normal considerations.

Refinements

Research now going on indicates some new developments which may ease the burden of confinement. The area of negative ions as beneficial to both the physical and psychological conditions of the inmates is a promising help. The research and development necessary to build submarines and space vehicles with their self-contained atmospheres will be useful for fall-out shelters.

Reports also indicate that roof pitch and ground drainage away from the building may reduce length of fall-out duration.

Chemical, bacteriological and radiological warfare considerations will entail similar factors of safety and protection. Therefore, the shelter for fall-out may be adjusted when more detailed facts are known concerning future weapons.

Solutions to above-grade protection are varied and depend on the type of building site. Existing structures may offer a high degree of protection when masonry construction has been used. Multi-story structures offer fairly good protection on the upper levels away from radiation emitted by particles on the ground or on nearby roofs.

I should like to suggest that in case of an emergency children take cover in the school constructed

shelters in place of being sent home according to the stated position of many state authorities. I am certain that the protection offered at school is superior to the home-made variety. I further believe that these shelters should be greatly oversized, as they are bound to become a sanctuary for families as well as students.

The long view

There are numerous advantages to below grade shelter construction when considered primarily as shelters, but other factors must also be taken into account. The problem of duplication of space and reserve systems and the crowding which appears to be necessary can be accentuated if the duration is only a day or so. Realizing the terrific problem of dealing with children in confined areas for long periods of time, teachers advise a program of regular classroom activities relieved by periods of diversionary exercise.

Based on cost premises previously made, it would appear that a complete underground program should be considered. In our present day above ground schools we have been aware that windows are not always required and have reduced them to a minimum, using a vision strip only large enough to provide eye relief, but providing a better control of light, heat and air. With the advent of year-long classes, air-conditioning has stressed the advantages of smaller windows.

With an air purification system the interior atmosphere can now be maintained economically, to a point where it will be superior to outside fresh air. New methods developed for space vehicles will maintain correct humidity, odor purity and even ion content. The control of environment is appreciated more than the outside view. A school being a functional structure with a definite performance requirement should seriously consider any proposals improving its output. With the same view in mind we have then a common solution to a better learning environment.

An underground school can be both functional and pleasant, but, above all, economical. Its interior can be colorful and spacious with atmosphere controlled for best teaching conditions. Maintenance of plant exterior would be reduced to a lawn mower and the school could have additional playground space because of 150 per cent site utilization. Large span units such as the gymnasium and auditorium could remain above grade, due to association with play fields or to public use for social activities.

In the face of "glass-box architecture" it seems somewhat drastic to consider a return to cave-like structures. But this is a logical development in view of shortages of building sites, regardless of atomic attack. The natural enhancement of the land by planting would be a welcome relief.

As with most progress, the difficult solution when tackled with a clear head can lead to a better result than that which has been accepted as the norm. The possibility of earth surrounded structures should be studied in the light of new knowledge available to us.

Data regarding fall-out is based on information furnished by the Office of Civil and Defense Mobilization. The remaining material is based on school construction experience in New York State, gained by Mr. Folley and the firm of which he is a partner. In addition, the publication, "School Shelter," by Eberle M. Smith Associates, prepared for the OCDM, is available from OCDM.

GLOSSARY OF RADIATION TERMS*

The following glossary defines scientific terms used in connection with reports and articles involving atomic science and radiation. It is included here as an aid to architects and engineers—not only for the two articles on this subject appearing this month, but as general reference on the topic.

Absorption coefficient A measure of the rate of decrease in intensity of a beam of photons or particles in its passage through a particular substance.

Absorbed dose Amount of energy imparted to matter by ionizing particles per unit of mass irradiated material at the place of interest. Expressed in "rads."

Accelerator A device for imparting large kinetic energy to charged particles, such as electrons, protons, deuterons and helium ions. Common types of accelerators are the cyclotron, tetatron, linear accelerator and Van de Graaff Electrostatic Accelerator.

Alpha particle A positively charged particle emitted from a nucleus and composed of two protons and two neutrons. It is identical in all measured properties with the nucleus of a helium atom.

Alpha ray A ray consisting of positively charged particles permitted during certain radioactive transformations.

Aluminum equivalent Thickness of aluminum that will afford the same protection under specified conditions as the material in question.

Attenuation The decrease in the dose rate of radiation in passing through a material.

Barn A unit of area used in expressing a nuclear cross section. 1 Barn = 10^{-28} cm². Cross sections per atom are customarily measured in barns.

Beta rays Particulate ionizing radiation consisting of electrons or positrons traveling at high speed.

Concrete equivalent The thickness of concrete based on a density of 2.35/cm³ (147 lb./ft.³). Affording the same attenuation, under specified conditions, as the material in question.

Contamination Radioactivity induced by the deposit or proximity of radioactive material or other materials.

Cosmic rays High energy particles originating in space.

Critical organ That part of the body that is most susceptible to radiation damage under the specific conditions considered.

Curie A measurement of radioactive decay. The quantity of material undergoing 3.7×10^{10} to the 10th power disintegrations per second. This is equivalent to the rate of disintegration of 1 gram of pure radium.

Cyclotron One of the particle accelerators used in research. A device for accelerating charged particles to high energies.

Direct radiation All radiation coming within x-ray tubes, tube housing or other radiation apparatus or sources, except the useful beam.

Dose The radiation delivered to a specified volume or to the whole body. The unit is the Roentgen.

Dose rate The radiation dose delivered per unit time.

Electron One of the atomic particles carrying an electric charge of 1 and orbiting about the atomic

*Reprinted through the courtesy of "The Construction Specifier," (Vol. 13, No. 4), from the article "CSI Recommended Practice for Radiation Protection and Shielding," by Donald G. Smith, AIA, CSI.

nucleus. Its negative charge equals the positive charge of the proton and establishes electrical balance in the atom.

Exposure The total quantity of radiation at a given point, measurable in air. The measurement of exposure is made at a given point in the radiation field without the presence of a scattering body.

Exposure rate The amount of radiation (exposure) delivered at a given point per unit time.

Film badge Appropriately packaged x-ray-sensitive film for detecting radiation received by persons. It is usually dental-film size, and worn or carried on the person.

Fission The breaking apart or "splitting" of the nucleus into two parts through the action of collision with another particle, in particular a neutron.

Fissionable material Elements which contain nuclei subject to fission under particle bombardment. Plutonium, thorium, uranium 238, 235, are typical.

Fusion The combining of nuclear particles through thermal effect.

Gamma radiation The emission of electromagnetic waves of shorter length than the x-rays used in medicine and of higher intensity. Due to the immense quantity emitted and their power to penetrate materials even at a distance, this is the most damaging type of radiation.

Geiger-Muller counter (GM counter)—A radiation detection instrument based on the ionization of gas.

Half-life The time required for the radiation of a radioactive substance to decrease by one-half.

Half-value layer (HVL) The thickness of attenuating material necessary to reduce the dose rate of any x-ray beam to one-half of its original value.

Heavy particle radiation Particulate ionizing radiation consisting of atomic nuclei of any mass traveling at high speed. (Protons, deuterons, helium nuclei, etc.) Alpha rays constitute a special kind of heavy particle radiation.

Hot A colloquial term meaning highly radioactive.

Intensity of radiation Energy flowing through unit area perpendicular to the beam per unit time, expressed in ergs per square centimeter per second or in watts per square centimeter.

Ion A charged atom or molecularly bound group of atoms, also a free electron or other charged subatomic particle. An ion pair consists of a positive ion and negative ion (usually an electron) having charges of the same magnitude and formed from a neutral atom or molecule by the action of radiation.

Ionization The process whereby a neutral atom or molecule is split into positive and negative ions.

Isotope The product of a nucleus to which has been added or removed neutron. Having the same number of protons, the product will retain the chemical characteristics of the original element but will have a different atomic mass number or weight.

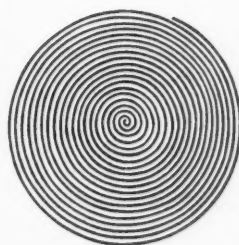
Isotope, radioactive By common usage, any radioactive nuclide produced in a reactor or in a particle accelerator. Correctly, it should include all the natural radioactive nuclides also.

Lead equivalent The thickness of lead affording the same attenuation, under specified conditions, as the material in question.

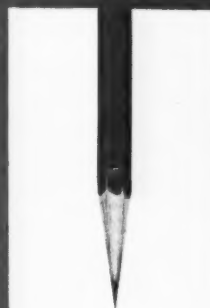
Mass Term used to describe weight or volume. (Mass thickness is the weight per unit surface area of a barrier expressed in pounds per sq. ft.)

Meson A nuclear particle having several forms of approximately $\frac{1}{6}$ th the mass of the proton.

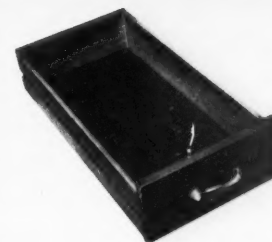
(Continued on page 40)



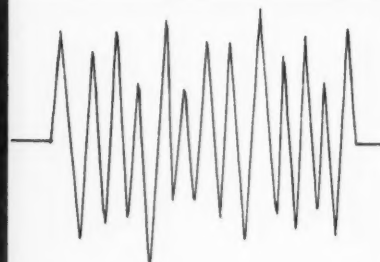
Spec'ing specifics?



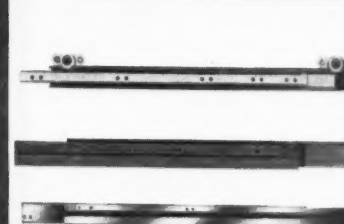
Architects must be certain about the function and durability of the products they specify.



Even when it comes to a drawer.



If it doesn't operate smoothly, it can make a loud complaint for such a small element.



If it does operate smoothly, it's probably mounted on Grant Drawer Slides.

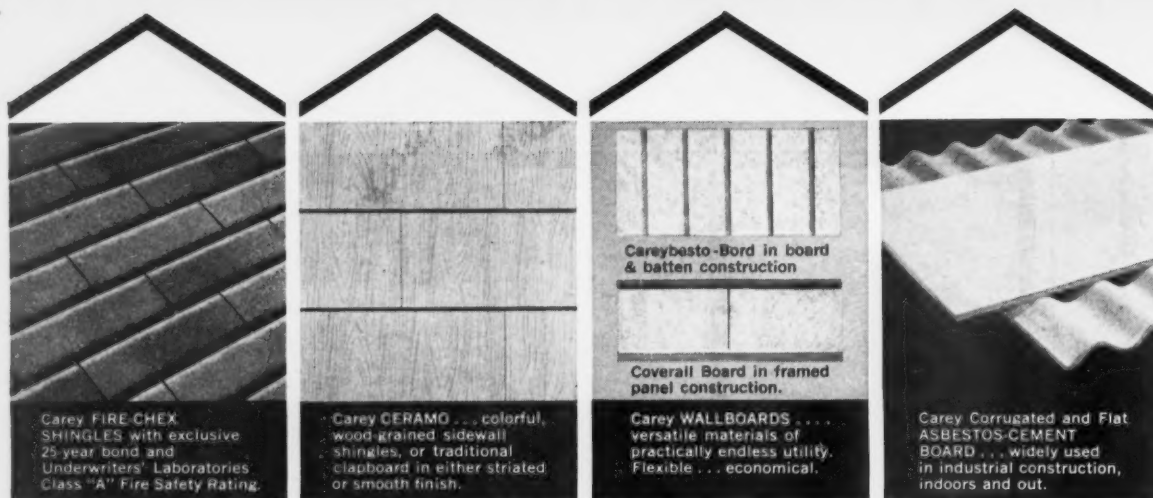
GRANT DRAWER SLIDES



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The complete line of PHILIP *Carey* and MIAMI *Carey* building products is available everywhere in the U.S.A.

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THE PHILIP CAREY MFG. COMPANY, CINCINNATI 15, OHIO / MIAMI CABINET DIVISION, THE PHILIP CAREY MFG. COMPANY, MIDDLETOWN, OHIO

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April 24-28



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GLOSSARY

(Continued from page 39)

Monitoring Periodic or continuous determination of the dose rate in an occupied area (area monitoring) or of the dose received by a person (personnel monitoring).

Neutron One of the nuclear particles having an atomic mass unit of 1.00893. The particle is electrically neutral.

Neutrino A nearly weightless particle of the nucleus and without an electric charge.

Nuclear radiation Any radiation emitted from the nucleus.

Nucleus The positive charged core of an atom, with which is associated practically the whole mass of the atom, but only a minute part of its volume.

Permissible dosage rate The maximum total dose to which any part of the body of a person shall be permitted to be exposed continuously or intermittently in a given time.

Positron A particle identical to an electron but having a positive charge instead of a negative common to the electron. Beta (positive) radiation is composed of positrons.

Protective barrier Barrier of attenuating material used to reduce radiation hazards.

Proton One of the nucleus, a nuclear particle. The nucleus of the hydrogen 1 atom. It carries a positive charge of 1. Its atomic mass unit is 1.00758. The number of protons in the nucleus determines the chemical characteristics of an element and also gives the elements its atomic number.

Quantity of radiation Is the time integral of intensity. It is the total energy that has passed through unit area perpendicular to the beam and is expressed in ergs per square centimeter or watts—seconds per square centimeter.

Rad Is the unit of absorbed dose and is 100 ergs/9. One millirad (1 mrad) is one thousandth of one rad.

Radiation Energy propagated through space. It is gamma rays and x-rays, alpha and beta particles, high speed electrons, neutrons, protons and other nuclear particles, but not sound or radio waves, or visible, infrared, or ultraviolet light.

Radiation hazard Hazard that exists in any region where dosage rate is greater than the permissible dosage rate. Permissible dosage rate (q.v.) shall be 0.300 Roentgens per week.

Radioactivity The characteristics of emitting radiation.

Radioactive material Any material—solid, liquid or gas that emits radiation spontaneously.

Radioisotope An isotope that is radioactive.

Rep (Roentgen—equivalent—physical) has been used extensively for the specification of permissible doses of ionizing radiations other than x-rays or Gamma Rays. The most widely accepted definition is that it is a unit of "absorbed dose" with a magnitude of 93 ergs/g, and the "rad"—100 ergs/g is negligible in the estimation of permissible doses.

Roentgen A highly technical unit of measurement of the energy absorbed by tissue as related to the ionization produced in air by X or Gamma Rays. A dosage of 400 roentgens is considered as being the "median" level dosage which will cause 5 per cent fatalities from the radiation effects of an atomic bomb.

Scattered radiation Radiation which, during passage through a substance has been deviated in direction. It may also have been modified by an increase in wave length.

Circle 124 for further information

PRODUCERS' COUNCIL

This is the first in a series of articles dealing with associations and societies which serve the professional interests of the architect and the consulting engineer. It is particularly timely that we should give our editorial attention to Producers' Council this month. Since its inception, the Council has enjoyed a close relationship with the American Institute of Architects. This month, as in previous years, Producers' Council will administer an exhibit of building products to be held at the annual AIA convention in Philadelphia, April 24-28. A list of the exhibiting companies appears on page 42.

The Producers' Council is a national organization of manufacturers of building products and equipment. It has grown from a manufacturers' committee formed in 1921 by the American Institute of Architects, to its present separate status of a national trade association comprised of nearly 200 manufacturers and 30 product trade associations. The Council and the AIA entered into an agreement of affiliation after the incorporation of the Council as a separate organization in 1929 and the formal affiliation has remained in continuous effect since that time.

Objectives

The original objective of the Council was to meet the need for a "better understanding among architects and producers as to their common interests in the characteristics, presentation, and appropriate utilization of the products entering into construction." While the original purpose of the Council has not changed substantially, it has been extended to include many other activities. As a result of the most recent review of the Agreement of Affiliation, the Institute and the Council are pledged to cooperate on the following activities:

1. To raise the standards of advertising and the dissemination of useful data and information on materials and methods of use to the architectural profession and the building industry.
2. To advance knowledge of the most effective use and assembly of materials commonly used together in building construction.
3. To advance the wide and rapid dissemination of advanced knowledge of materials and methods resulting from research or field experience.
4. To assist in the education of students of architecture, engineering and related construction arts, including building trades apprentices and students in vocational and trade schools.
5. To secure to the entire construction industry and the public the economies inherent in modular coordination and dimensional standardization.
6. To assure the architectural profession of the maintenance of the proper standards of advertising material in the Council's *Technical Bulletin*.
7. To encourage and assist in the formation of the collaboration between joint committees composed of members of local chapters of the Institute and the Council.

Services to the architect

The Council has a history of more than 50 liaison committee meetings with the AIA. The Council and the AIA sponsor jointly and the Council administers

the product exhibition which is one of the features of the AIA's annual convention. A seminar program is another outgrowth of the liaison committee's work. The program consists of three seminars—curtain wall, roofing, and air-conditioning—sponsored by Council members, prepared by the Council in coordination with technical men from member companies, and specifically oriented to architects. The seminars are sponsored and prepared in package form on a national level and presented locally through the chapter structure.

The *Technical Bulletin* is published quarterly for the primary purpose of keeping the architect currently informed on technical developments, including new products and new techniques of design and construction. It is distributed without charge to the entire AIA membership. Each issue concentrates on a specific area, such as school or commercial construction. One issue annually concentrates on research and new products, including about 900 listings of building product literature available.

Architectural sales representatives' Institutes are sponsored by the Council. These are three-day concentrated sessions taught by architectural educators and practicing architects with the purpose of exposing architectural salesmen to the business side of architectural practice.

General activities

Much of the Council's work on the national and the local levels affects the professions of architecture, home building, and engineering simultaneously. On the national level, an important example is the Council's advocacy of modular construction. Acting as co-sponsors, the Council, the AIA, the NAHB, and the Associated General Contractors organized and are the principal support of the Modular Building Standards Assn., which is now housed in the Council's offices.

The Distribution Study is a five-year study which affects all the building professions. Sponsored by 56 Council members, its main objective is an evaluation of changes rapidly taking place in the distribution of building materials.

Membership

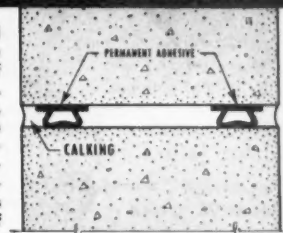
Membership in Producers' Council is open to any person, firm, corporation or division of a corporation which is engaged in the manufacturing of building materials or equipment. A recommendation by the Council's membership invitation committee, and an affirmative vote from two-thirds of the members of the board of directors are necessary to pass on an applicant. Recommendations of the membership invitation committee are influenced by the character, reputation, financial stability, product quality and method and extent of distribution of products of prospective members.

Each member company designates a man from its top executive echelon to be its "official representative" to the Council. The official representatives elect the officers and the Board of Directors, the association's governing body. The officers and the board along with the Council's staff organization (headed by a managing director), form the national office located at 2029 K St., N. W., Washington 6, D. C.

RUBBER or VINYL SEALS and GASKETS

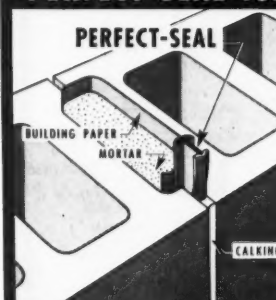
for PRECAST CONCRETE PANELS

Williams Panel Seals (Pats. Pend.) were developed especially for use in vertical and horizontal joints of precast concrete wall panels . . . they are extrusions of expanded, closed-cell Neoprene Rubber. This closed-cell material, and the hollow-core design, provide the properties which assure a positive pressure-contact seal in panel joints under all conditions—each type of seal readily compensates for variations in joint width, irregular joint surfaces and erection adjustments.



VERTICAL JOINT
6" Precast Concrete Panel

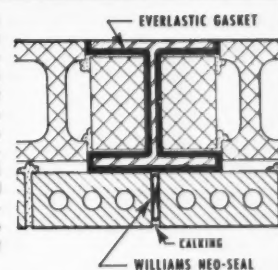
PERFECT-SEAL for CONTROL JOINTS



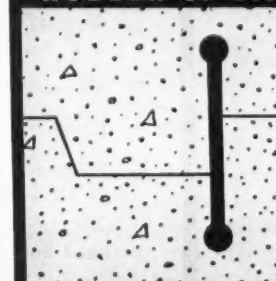
Williams "Perfect-Seal" (Pat. Pend.) is a specially designed seal for use in Mortar-Keyed Control Joints . . . It provides continuous four-point pressure-contact sealing which keeps moisture out of joints and prevents air passage. The T-Section is a high-grade rubber compound; the cross-sealing member at the base of the "T" is a strip of readily compressible, non-absorbent, expanded closed-cell Neoprene Rubber—it provides an effective pressure-contact seal directly behind the calking.

EVERLASTIC MASONRY GASKETS

Everlastic Masonry Gaskets are a readily compressible, nonabsorbent Elastomer which is impervious to water and inert to heat, cold and acids. In masonry joints, they permit linear expansion, and seal the joints against moisture penetration which causes frost damage. Everlastic Gaskets should be used between sill and coping stones, stone or prefab metal wall panels, and to isolate and cushion all steel or concrete columns to permit normal movement without damage to masonry walls.



RUBBER or VINYL WATERSTOPS



Williams Waterstops are made from Natural Rubber Stock and designed for maximum effectiveness in any type of cast-in-place construction joint. They will bend around corners, and will not crack or tear from shear action. Tensile Test: 3990 lbs., Elongation Test: 650%. Available in rolls up to 80 feet in length. Molded union and junction fittings available. Williams Waterstops can be furnished in Vinyl or Neoprene for industrial uses where resistance to oil or other injurious wastes is desirable.

See Sweet's Files, or Write for Information.

WILLIAMS
EQUIPMENT and SUPPLY CO.
486 W. Eight Mile Rd., Hazel Park, Michigan

Circle 125 for further information

1961 AIA BUILDING PRODUCTS EXHIBITORS

The following is a list of manufacturers who will exhibit at the building products exhibition to be held at the AIA convention in Philadelphia, April 24-28. It is sponsored by the AIA and Producers' Council and administered by Producers' Council.

Booth No.	Exhibitor	Booth No.	Exhibitor	Booth No.	Exhibitor	Booth No.	Exhibitor
84	Allied Chemical Corp. Barrett Div. B. L. Thompson	66	Congoleum-Nairn, Inc. Robert C. Kopyta	82	Kaiser Aluminum & Chemical Corp. W. H. Griffith	48	Rez Wood-Tones, Inc. Joseph M. MacDougall
20	Aluminum Co. of America Ralph L. Hoy	57	Connor Lumber and Land Co.	88	Kawneer Co. William L. Cooper	3	Rigidized Metals Corp. R. G. Leary
2	American Air Filter Co. Jack W. O'Neill	9	Corning Glass Works F. E. Rector	51	Kentile, Inc. John Davis	13	Rilco Laminated Products Charles W. Masterman
36	American Gas Assn. Jerry Mullins	69	Crane Co. R. F. Caldrone	42	Kohler Co. R. C. Angelbeck	43	Rolscreen Co. Paul V. Farver
83	American Locker Co., Inc. George Niden	85	Cupples Products Corp. Charles H. Mahn	65	Knoll Associates, Inc. Paul R. Copeland, Jr.	34	The Ruberoid Co. Mastic Tile Div. Seymour Zelnick
79	American Olean Tile Co. George W. Thorp, III	64	Day-Brite Lightning, Inc. Frank C. Gilbert	17	Koppers Co., Inc. Tar Products Div. Earl Bennett	44	Schlage Lock Co. Dallas E. Smith
90	American-Saint Gobain Corp. Richard W. Rigg	70	Douglas Fir Plywood Assn. William M. Dickson	33	Lamont & Riley Co. Chapin Riley	54	Sloan Valve Co. Charles C. Allen
74	Andersen Corp. H. C. Mattlin	72	The Dow Chemical Co. R. L. Lownsbury	12	Libbey-Owens-Ford Glass Co. A. M. (Brig) Young	52	St. Regis Paper Co. Panelyte Div. J. Edmund Colloton, Jr.
39	Arcadia Metal Products L. Johnson	19	DuKane Corp. N. A. Plagge	45	W. R. Meadows, Inc. Robert G. Stilling	53	Stanley Works Harry Amtmann
58	Arketex Ceramic Corp. Ronald L. Bledsoe	37	E. I. du Pont de Nemours & Co. W. S. Armstrong, Jr.	28	The Miller Co. Robert L. Kirshner	49	Structural Clay Products Institute Jack E. Clark
62	Armento Architectural Arts Louis Armento	40	Dwyer Products Corp. W. B. Myers	21	Minneapolis-Honeywell Regulator Co. W. A. Burton	91	Stylon Corp. Lewis S. Dabney
10	Armstrong Cork Co. Floor Div. Russell C. Stabern	73	Executone, Inc. H. Federbush	61	Mo-Sai Institute, Inc. Floyd L. Mabie	47	Ther-Mo Roof, Inc.
41	Arvin Industries, Inc. Fred Meyer	48	Facing Tile Institute	75	The Mosaic Tile Co. Karl G. Keck, Jr.	4	Timber Structures, Inc. Paul F. Ostrow
89	Azrock Floor Products Div. Uvalde Rock Asphalt Co. James C. Vynalek	5	The Fixible Co. J. Austin Smith	47	National Assn. of Elevator Contractors M. L. Forthmann	20	Unistrut Robert Sundene
55	B. B. Chemical Co. (United Shoe Machinery) D. S. Andrews, Jr.	32	Follansbee Steel Corp. F. P. Laubenheimer	30	National Lumber Manufacturers Assn. Paul R. Beattie	60	Unit Structures, Inc. Norma Scolatti
1	The Bilco Co. B. E. Farrell, Jr.	59	Gustin-Bacon R. C. Lang	35	New Castle Products, Inc. R. W. Bettner	29	U. S. Ceramic Tile Co. Harold R. Thomas
38	Bradley Washfountain	81	Haws Drinking Faucet Co. J. R. Haws	25	NuTone, Inc. Paul Venezia	8	U. S. Gypsum Co. Fred R. Jackson
36	Caloric Appliance Corp. Architectural Porcelain Div. Victor Klein	31	Hillyard Chemical Co. E. C. Spratt	6	Owens-Corning Fiberglas Corp. A. L. Haight	86	United States Plywood Corp. Walter Kent
7	The Philip Carey Manufacturing Co. John C. Thomas	56	Holcomb & Hoke Manufacturing Co. Ed Wolf	11	Pittsburgh Corning Corp. J. H. Coleman	14	United States Steel Corp. William R. Fawcett
22	The Celotex Corp. J. A. Hash	24	Independent Nail & Packing Co. Phillip D. Stone	50	Pittsburgh Plate Glass Co. Elmer A. Lundberg	76	Universal-Rundle Corp. W. A. Shaffer
15	Cold Spring Granite Co. Ray Griffin	87	Indiana Limestone Co., Inc. Reed Beard	63	S. H. Pomeroy Co. Window Div. Herman C. Knebel	78	Vermont Marble Co. Robert F. Holden
46	Columbia Acoustics & Fireproofing E. W. Fairweather	80	Inland Steel Products Co. T. G. Bennett	16	Red Cedar Shingle Bureau V. G. Peterson	68	Westinghouse Electric Corp. P. H. Grunnagle
8	Columbus Coated Fabrics Corp. Harold L. Hays	77	The International Nickel Co. H. S. Lewis			26	Wilkinson Chutes, Inc. E. J. Czaplicke
		71	Johns-Manville Corp. Thomas F. Curry				
		27	Just Manufacturing Co. H. W. Hochstetter				



CASE HISTORY 1/Chicago: Central District filtration plant—construction problems.

CASE HISTORY 2/Hartford: Central heating and cooling service for large scale urban developments.

Successful execution of large scale urban and regional planning schemes will depend in no small measure on the capacity of engineering to play its part in providing auxiliary services. We offer here two recent engineering developments directly affecting planning progress. One demonstrates ingenuity in doing on a great scale what has already been accomplished on a more modest plane. The other constitutes a new development in the distribution of heating and cooling over long distance.

World's largest municipal water plant

Water is a vital planning element. The size and complexity of a plant supplying drinking water to a city varies directly as the condition of water at the source, its distance from the city and, clearly enough, the size of the city, its rate of growth and its economic composition. The city of Chicago, using the polluted waters of Lake Michigan as its source, is in the process of completing what is, as of today, the largest municipal water plant in the world. The plant, intended to supply 4,600,000 residents in the northern two-thirds of the city, as well as 15,520 industrial users, takes into account future growth. It is to cost \$102 million.

An idea of the new plant's importance is in its capacity to pump and purify more than 1-million gallons of water every minute or 1.68-billion gallons per day.

Primary filtering of the Lake Michigan water will be handled by 16 large settling tanks. Primary excavation required moving 31,000 cubic yards of earth; some 53,000 timber piles had to be driven to support the tanks; 32-million pounds of steel were needed to reinforce 157,000 cubic yards of concrete; another million pounds of metal products were required; and 120,000 cubic yards of earth are being "backfilled" around the structure.

All materials for the project are brought in by trucks. Because of muddy, makeshift roads, however, deliveries frequently are made short of the best location. Movement from trucks to other parts of the site is by two cranes, manufactured by the Harnischfeger Corp. of Milwaukee.

One machine, a truck crane equipped with a "boom" 170 feet long, lifts 20-ton loads of 30-foot long by one-inch diameter reinforcing rods into position for placing within the wooden forms which hold the wet concrete. It also pours concrete, moving loads from mixer trucks directly to the forms in a

bottom-dump concrete bucket. Placement of concrete proceeded at a maximum rate of 40 cubic yards per hour.

Handling delivery of many materials—concrete, reinforcing steel, pipe, wooden forms, valves and machinery—is by a unit mounted on crawler tracks, which travels over spongy ground and is often used to pull trucks and other machines from the mud.

Filter bed problem

With the 16 settling tanks nearing completion, there arose a smaller but perhaps even more difficult task. The contract for the filter "beds" called for installing "draw-off" pipe and supports, more than 78,000 tons of sand and gravel, and concrete troughs within the tanks.

This would often be a routine job for a contractor. However, no available crane working from an accessible point outside the tanks could span the 60 by 600-foot interior where the material should be placed—standard rail-mounted, overhead-type cranes could not be mounted on top of the tanks—and there was no way to use a conveyor system to move the material.

To solve the problem, an ingenious combination of home-engineered and commercial equipment was used. Engineers of the contractors for the filter beds designed a 60-foot overhead gantry mounted on four sets of four automotive tires. Other guide wheels keep the gantry traveling straight on the narrow, 12-inch wide tops of the tanks.

An ingenious solution

To provide power for moving the gantry and a mechanism for lifting material into place, the contractor installed a specially built, lightweight crane on its unit. This crane is normally mounted on crawler tracks, but in this case, just the "upper" or engine-operator cab and boom were ordered.

The manufacturers were also asked to eliminate as much weight from the machine as possible without reducing its 15-ton lifting capacity. They accordingly weighed each casting available for assembly of the rig and chose the lightest of each necessary part. In this manner some 800 pounds were saved.

With special equipment in operation, work on the filter beds started with installation of four-inch diameter pipe in the bottom of each tank. The truck crane moved 5,000 to 11,000-pound loads of pipe from delivery trucks, 40 feet below and outside the tanks, into place on the floor.

Hand place two layers

Following installation of the draw-off pipes, workers then handplaced two layers of gravel to insure that the ½-inch openings in the pipes would not be blocked. Directly over the pipe they placed a 4-inch layer of 2½ to 4-inch gravel. On top of this went a second 4-inch layer of 1 to 2½-inch material.

Subsequent layers of material, from 1-inch gravel to .62 millimeter sand, were placed directly from two hoppers mounted on the gantry. Gravel and sand for these layers were delivered in bins weighing 5,500 pounds including contents.

To charge the hoppers, the special crane picked up a bin from the delivery truck, dumped it into a hopper and replaced the empty bin. This cycle was completed more than 4,000 times during the gravel and sand portion of the bedding.

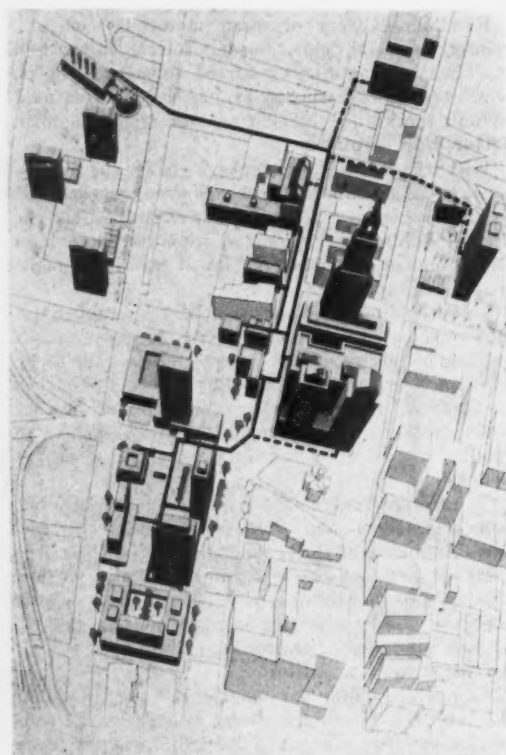
Three water sources

Upon completion of all major work, scheduled for mid-1962, the new Central District plant may draw

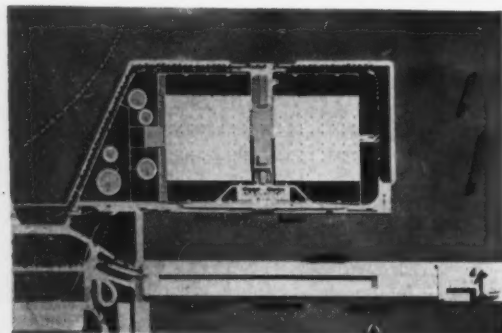
(Continued on page 44)

2 CASE HISTORIES

(Continued from page 43)



Aerial perspective of downtown Hartford shows proposed route of pipeline through which heating and cooling service will be supplied from the utility company's new central plant (upper left). Connecticut River is to the left, and Constitution Plaza, the new \$35 million redevelopment project now under construction, is the dark complex of buildings at lower left. The Travelers Insurance Company Building, tallest in Hartford, will be served by the plant (center). Gray buildings at upper right (Bushnell Plaza), top (proposed Federal building), left (Riverview Apartments) and other buildings connected by dotted lines show probable future service obtained by extending the pipeline. Lightly shaded buildings (lower right) offer potential area of growth. (Data on Hartford heating and cooling plant courtesy of the Carrier Corporation.)



Aerial view of model shows finished appearance of Central District filtration plant in Chicago. Long structure at bottom is Navy Pier. Looking north to the filtration plant, circular areas to the left are filtered water reservoirs. The two square white areas are filter banks. The four long rectangular spaces, two on each side of the filter banks, are settling tanks. Water enters the plant through intake ports at the center of the north side. Barges dock at the south side and unload chemicals for use in the plant.

Lake Michigan water from three sources. A 20-foot diameter inlet shaft will connect the plant to already existing 16-foot and 10-foot tunnels leading to the Dever and Carter Harrison water intake "cribs" two and one-half miles out in the lake.

To pull water from a closer source, the new plant also will be equipped with eight 96-by 120-inch sluice gates leading directly to the pump intakes.

Filtered water will flow out from the plant through the 16-foot diameter North District and Chicago Ave. tunnels.

Central plant heating and cooling

Another recent development is in the field of long distance transmission of heating and cooling, and is noteworthy not only because of the engineering problems involved but also because of its economic implications. As part of the Hartford (Conn.) urban renewal plan, a \$3 million central plant is to be established in downtown Hartford providing a total of two miles of steam and chilled water pipelines. Air-conditioning is to be sold in much the same way in which utilities companies currently distribute gas and electricity, with meters to determine the amount of steam and chilled water used by the air-conditioning system in each building.

The proposed plant, owned by the Hartford Gas Co., will as a start supply chilled water and steam to three separate projects forming part of the Hartford plan: (1) Constitution Plaza, a \$35-million project now under construction which, when completed in 1963, will contain three major office buildings, a 250-room hotel, a new broadcasting facility and a shopping center; (2) Bushnell Plaza, a \$10-million high rise apartment project; and (3) Riverview Apartments, another housing center now in the planning stage.

The plant is located near the Connecticut River, permitting pumping of water from the river to cool condensers and eliminating the need for cooling towers. It will consist of two buildings connected by a passway. A circular building will house offices, dispatch center, and control room. Another building will contain boilers and refrigeration equipment.

Initially, the cooling equipment will consist of one centrifugal refrigerating machine with a cooling capacity of 3,000 tons, two smaller centrifugals with capacities of 1,500 tons each, and a 500 ton absorption unit for a total of 6,500 tons.

These machines will be driven by steam turbines. Boilers will have a steam capacity of 150,000 pounds per hour, or the equivalent of 4,500 boiler horsepower.

From this plant, will be run two sets of pipelines consisting of supply and return lines for chilled water, and supply and return lines to carry steam. Both supply and return lines for chilled water will be 24 inches in diameter. The steam supply line will be 12-inch piping and the return line will be five inches in diameter. All lines will be underground and all except the return line for chilled water will be insulated. The system will be cathodically protected. Both steam and chilled water will be metered. Total initial length of piping will be 14,400 feet, or 3,600 feet for each of the two supply lines and each of the two return lines.

As demand for chilled water and steam increases, size and capacity of the plant can be expanded. Increase in demand is expected to be such that, by 1964, steam capacity of the plant will be 225,000 pounds per hour and the cooling capacity will be at

least 10,000 tons (10,000 tons of ice would make 320,000,000 ice cubes; it would fill more than 275 railroad boxcars or it would make a one foot square column of ice 65 miles into space).

In addition, looping of pipelines will be provided so that heating and cooling service can be extended to future buildings or to new customers in existing building. Schedules are so planned that service will go to each new building in Constitution Plaza as it is completed. The plan has taken into consideration the other new projects planned for the next ten years. Both Bushnell Plaza and Riverview Apartments can be reached economically by extending lines. Numerous existing buildings bordering the proposed lines could be connected very simply.

Consumer advantages

Among the advantages to the consumers is saving of space. By having steam and chilled water piped from a central source, the user eliminates the need for installation of large boilers and refrigeration equipment. This space can then be used as a retail sales area, for storage or files, additional office space or other purposes. Since all buildings in Constitution Plaza are to receive heating and air-conditioning services from its central plant, none contains in its plans provision for boiler rooms, chimneys or chilled water plants.

From an economical aspect, the central plant approach avoids capital expense for equipment and salary for its licensed operator; likewise all maintenance costs are transferred to the supplier.

An important aspect of projects of this type is the economic advantage accruing to the developer. If the developer can proceed on an independent business basis, there will be no recourse to government support and the consequent rise in the tax burden.

Utilities company advantages

In this case, by making air-conditioning services available the company has found a way to ease a problem that has plagued utilities for years—the balancing of the gas load to even out the peaks and valleys of summer and winter operation.

The seriousness of this problem is shown by a few figures. In the winter of 1960-61, Hartford Gas Co. contracts require purchase of 26,000 MCF—with 1 MCF equaling 1,000 cubic feet—of gas per day. Their peak day thus far has been 27,900 MCF—the difference being made up from their storage facilities. Last summer, with virtually no heating requirement to fill, output was only 7,400 MCF per day, although they still had to take, or pay for, 18,800 MCF contract quantity.

It is characteristic of the gas business that its peak requirements are in the winter, causing a valley during the summer. Since, in general, the same amount of natural gas must be purchased each day of the year from transmission companies, summer will obviously show an excess quantity of gas available.

However, with a known and expanding cooling load to meet, it is possible to even out the summer valley. And, by improving the over-all load factor, the utilities company can also improve its purchasing position with the natural gas suppliers.

Pros and cons of central plant

Discussing the technical aspects of the project, Erik B. J. Roos, a partner in the firm of Seelye, Stevenson, Value and Knecht, consulting engineers who made the preliminary studies, said that in general, the larger a central plant, the greater were its advantages. But that such a plant had to distribute

its output through underground pipes, and the longer they were, the greater the disadvantages. In other words, a concentrated load was desirable under all conditions anywhere.

He went on to compare a central plant having fewer and larger units, and serving, for example, 20 buildings, with the total owning and operating cost of all of these 20 buildings with their own heating and cooling plants, and listed the following points in favor of a central plant:

(1) Larger units cost less per unit of output, whether this be pounds of steam or tons of refrigeration. Hence capital cost for equipment is less.

(2) Larger units need less space than a number of smaller units of the same output. Also, a building housing a central plant does not require as expensive construction as would the same space for the same purpose in, say, a hotel, an office building, a television studio, or a department store.

(3) Within the limits imposed by the cost of distribution, a central plant may be located on the least desirable and, therefore, the least costly real estate.

(4) Larger machines can afford greater refinements in design, construction, instrumentation and control. This results in more efficient operation.

(5) A central plant will have less duplication of auxiliaries, such as fuel pumps, water treatment, etc. Here again, greater refinements and performance result.

(6) Each of the 20 buildings mentioned should have at least two boilers, one being a spare for safety's sake. This requirement often means the near doubling of equipment and cost. A spare boiler for a central plant of, say five units, means less than 20 per cent more in additional cost. This is a big capital saving.

(7) In a central plant at partial loads, which is the situation most of the time, only enough units, each operating near its point of maximum efficiency, need be put on the line to meet the load. So operation costs less.

(8) A large central plant can usually purchase its fuel and power at lower cost, thanks to good old quantity discount.

(9) Compared to the 20 buildings used as an illustration, a central plant needs much less personnel, and these have no other function to perform than to look after their equipment. Furthermore, better qualified personnel are needed and can be justified. All of this means more efficient operation of more efficient equipment.

(10) Better qualified personnel having only one thing to do cannot help but take some pride in what they do. This and the more accurate records kept in a central plant tend to decrease less-than-careful performance.

Among the disadvantages of a central plant, the chief is the need for external distribution, which individual plants as a rule do not require. Roos broke down this problem as follows:

(1) For practical reasons the external distribution must be run underground, which is of course more costly than merely running piping around inside a building in which it is protected from the weather.

(2) Underground piping and its insulation must be protected against corrosion, electrolytic action, and vibration from traffic above. Where the water table is high this protection becomes more expensive,

(Continued on page 46)



Safe, glare-free daylighting on a budget

You can't see any "hot spots" under these skylights, can you?

They're made of a reinforced plastic that diffuses the light, banishes glare. Yet they transmit as much as 85% of the light that's available.

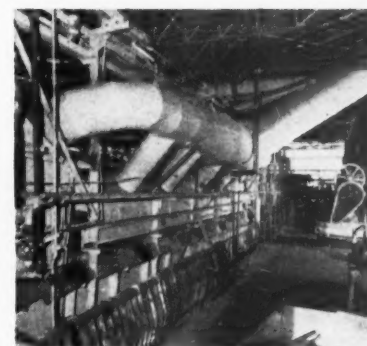
These domed plastic skylights are safer, because they can't shatter into a thousand flying fragments. Safer, too, because the plastic won't support combustion—can't feed a fire, ever. They cost less to buy and to install than conventional skylights:

Notice how soft the shadows are on the walls? That's typical of light transmission through these domed Consolite fire-retardant skylights. Consolite (registered trademark) is a product of Consolidated General Products, Inc., Houston, Texas.

they're made in one piece, with integral flashing.

If you're working on plans that call for fire-retardant construction, you'll want to know more about this safer plastic and the many interesting things you can do with it. It's called Hetron.[®] You can get it made up into glass-reinforced corrugated sheets, flat panes, and striking textured interior panels, as well as skylights. Corrosion-resistant pipes, ducts, and process equipment, too. All are designed to meet stiffest fire codes.

We don't make these structural materials; we just supply the basic plastic, Hetron, that makes them safer. We'll be glad to send you a list of expert fabricators who can supply you. Just write us or check the reader's service card.



HEIL PROCESS EQUIPMENT CO.

Handle corrosive fumes safely in fire-retardant ducts fabricated with Hetron polyester. In plant after plant they outlast other materials, cut replacement and upkeep costs. Hetron ducts above saved two-thirds the cost of replacing a previous system damaged by fire; cost less to install; made sprinklers unnecessary.

DUREZ PLASTICS DIVISION

HOOKER CHEMICAL CORPORATION, 9204 WALCK RD., NORTH TONAWANDA, N. Y.

HOOKER
CHEMICALS
PLASTICS

Circle 126 for further information

DEADLINE
APPROACHING
*for Manufacturer
Listings:*

1961 Edition of A. I. A. Building Products Register Now in Preparation

The American Institute of Architects will shortly publish the second edition of the *Building Products Register*. Designed to aid architects, engineers and other building industry specifiers in selecting building products, the Register's usefulness in 1961 will be enhanced by

- More individual product listings (approximately 2,500—up 92% over first edition)
- More abstracts of technical standards and specifications (approximately 1,000—up 66% over first edition)
- More major categories of building products covered (technical data and performance criteria for 24 categories will be provided—33% more than first edition)
- Revised format, based upon suggestions from architects and manufacturers after experience with first edition, making it easier to use
- Addition of trade names index for easy identification

The Register's great value to users—assembling in one reference work data formerly spread over several—makes it a valuable medium. It places accurate information, expressed in terms an architect and engineer need, before a designer *at the time products are selected*. Manufacturers renewing listings for 1961—99% of respondents to a preliminary survey—are increasing the number of their product listings an average of 30%. Product listings are \$50 each, with reduced costs for extra listings. For complete information about listing your products, write

AIA Building Products Register,
The American Institute of Architects

1735 New York Avenue, N. W., Washington 6, D. C.

2 CASE HISTORIES

(Continued from page 45)

and also a maintenance problem.

(3) It is obviously less expensive to run piping in sandy soil than through shale or rock, or stuff with boulders in it.

(4) Equally obvious is the fact that when, as is usually the case, the piping is run in streets, the more obstructions due to storm and sanitary sewers, electrical conduit, etc., the more expensive is the installation.

(5) It is clear that to distribute the same cooling and heating load one mile costs more than half a mile.

(6) It is also clear that the longer the piping the greater are the heat losses and gains. In the north-eastern United States, ground temperature is generally about 50° and since chilled water is usually supplied at about 45° the small temperature difference results in comparatively small losses.

These disadvantages are evidently much more subject to strictly local conditions than are the advantages.

Some intangible assets favoring central plants were cited as follows:

(1) The individual building management is relieved of responsibility of operating its own plants, as well as the hiring and managing of personnel; usually building managers are not completely qualified and must rely upon the technical recommendations of lower paid help to advise them when things go wrong. Cooling towers are not required, possible noise and vibration of equipment do not exist, no space is removed from rental, and smoke stacks and nuisance are eliminated.

(2) Smoke control needs special mention, for more and more municipalities are becoming increasingly aware of it. In a central plant the constant supervision of more refined equipment can achieve the utmost in smoke control, with considerably less cost, fuss, bother and fines.

Where does it pay to install a public utility of this type? The two main questions that arise are: Is the load there and what will it cost to produce the stuff?

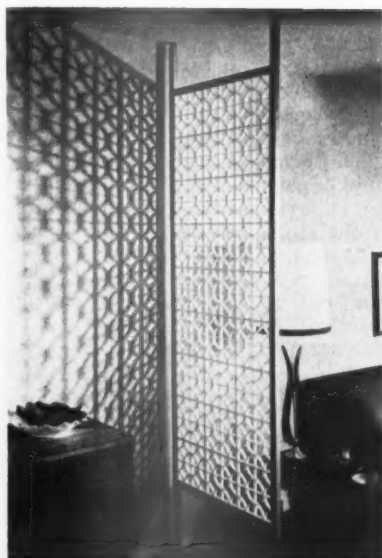
"In general," Mr. Roos went on, along financial lines, "we can say that a central plant for this purpose is perhaps justified if the cost of production is estimated to be in the neighborhood of about 6¢ per hour per ton of refrigeration and about \$120 per 1,000 pounds of steam or equivalent in hot water. This is equal to about two cents per 100 square feet per hour for cooling and 1.2 cents per 100 square feet per hour for heating. However, this again is subject to local variations in the cost of fuel and power, and other things.

"Yet even if the cost of production is in favor of such a central plant, there must be an immediate possibility of selling at least 2,500 tons of refrigeration and about 50,000 pounds of steam per hour. Also this is subject to local variations. As a very rough estimate such a plant and its distribution will require a capital outlay of about \$750,000 which cannot lie idle.

"An immediate minimum load as estimated above must be there. It is in this matter that urban redevelopment is so important, because in this case the whole operation can be well planned for the benefit of all beforehand, with a proper schedule for erection and operation carefully prepared. From then on expansion in all directions is economically possible within the limits of the cost of distribution."

PRODUCTS, EQUIPMENT, MATERIALS

Report of recent developments by industry, based on data furnished by mfrs. Inquiry cards for further information face pages 1 and 114.



FRAMED ORNAMENTAL PANEL DIVIDER

MFR'S DESCRIPTION: *Monterey* screen is framed panel divider comprised of ornamental grillework framed in anodized aluminum.

USES: as divider in residential and commercial applications.

SPECS/FEATURES: screen can be installed quickly without tools. Concealed springs in the end posts anchor the floor-to-ceiling unit in place. Grillework is made of $\frac{3}{4}$ " polystyrene; sturdy gold-brass framing is made of extruded aluminum with an anodized satin finish. Frame is easy to clean and will not tarnish. Screen comes completely assembled and ready to install. Over-all width is 26" and the height is adjustable from 7'10" to 9'3".

AIA FILE NO. 15-J

MFR: HOLCOMB & HOKE MFG. CO., INC.
Circle 200 for further information



AUTOMATIC ON-OFF OUTDOOR LIGHT

MFR'S DESCRIPTION: an outdoor luminaire that turns itself on at night and off in the daytime.

USES: parking lots, shopping centers, ramps, private roadways, outdoor work places, etc.

SPECS/FEATURES: any standard NEMA photoelectric cell can be used with the luminaire. The basic uses an *Endural* glass bowl refractor with optical prisms on inside and outside surfaces. Shapes and location of the prisms are designed to assure uniform illumination over a broad area and to avoid glare. The fixture parts are made of aluminum and stainless steel to resist corrosion and the overall unit is designed in a contemporary style and engineered for use with incandescent or mercury-vapor lamps.

AIA FILE NO. 31-F-22

MFR: HOLOPHANE CO.
Circle 201 for further information



TRANSLUCENT PLASTIC CELLULAR CORE DOOR

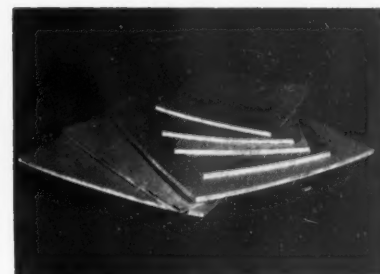
MFR'S DESCRIPTION: *Panelux* is cellular core door with rectangular honeycomb grid, which is faced with skins of translucent reinforced *Laminac* polyester resins.

USES: exterior and interior applications.

SPECS/FEATURES: plastic face has high resistance to abrasion and impact. Smooth surface is practically impervious to stain and can be washed with damp cloth. Available in standard type for residences and high impact type intended to withstand the strain of use in schools, commercial and institutional use. Door does not require painting. The plastic skin resembles Japanese parchment and cellular core is available in combinations of clear and colored cells for decorative flexibility.

AIA FILE NO. 16

MFR: MONOSTRUCTURE, INC.
Circle 202 for further information



LEATHER TILE FOR EXECUTIVE OFFICES

MFR'S DESCRIPTION: natural color, square leather tiles of treated and prepared cowhide.

USES: executive offices, luxury homes, etc.

SPECS/FEATURES: mfr claims highly satisfactory results in laboratory wear and abrasion tests. Dents are not permanent due to resiliency of leather. Simple bleach will remove major stains without harming or discoloring tile. Tile has a tendency to retain heat in cold weather and to lose it in warm weather. It also absorbs sound. Price, \$2.50 psf, \$22.50 psy. Mfr provides special adhering material.

AIA FILE NO. 23-G

MFR: LEATHER TILE INDUSTRIES
Circle 203 for further information

PRODUCTS, EQUIPMENT, MATERIALS

WINDOWS

ALUMINUM WINDOWS WITH INSULATED GLASS UNITS

MFR'S DESCRIPTION: *Perma-Pane* hermetically sealed glass units are now offered as a standard feature in mfr's line of horizontal gliding prime aluminum windows and window walls.

USES: various window applications. SPECS/FEATURES: *Perma-Pane* consists of two panes of glass sealed together with 1/4" of moisture controlled air space between them. An

aluminum channel placed between the panes acts as a permanent spacer; durable synthetic rubber applied to perimeter completes sealing. Mfr reports unit provides insulation barrier that reduces HVAC costs and eliminates need for storm windows. Units are also offered with diamond or rectangular aluminum muntin bars, sealed between the glass, designated *Colonialyte*.

AIA FILE NO. 16-J

MFR: GLIDORAMA DIV., WHIZZER INDUSTRIES, INC.

Circle 204 for further information

DRAFTS

HEAT
LOSSES

WATER SEEPAGE
through doors & windows

NOISE
when you need
soundproofing

LIGHT
when you need
darkness

these problems
disappear when
you specify **ZERO**
weather stripping

ZERO's new 28-page 1961 Catalog answers all these problems. Full scale drawings make it easier to use. Look us up in Sweet's (19b-ZER) or write for your copy TODAY!



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- saddles
- lightproofing
- soundproofing
- sliding doors
- saddles for floor hinged doors



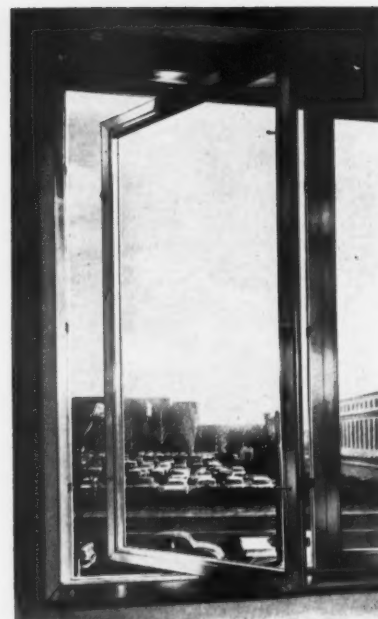
19b-Zer



ZERO WEATHER STRIPPING CO., INC.

453 East 136th Street • New York 54 • Phone: LUdlow 5-3230

Circle 128 for further information



REVERSIBLE METAL WINDOW UNIT

MFR'S DESCRIPTION: a reversible window unit, economically priced and available for both single or double glazing units, is available.

USES: commercial and institutional applications.

SPECS/FEATURES: window is offered in aluminum or bronze and is double-weatherstripped with vinyl plastic. It provides a 360° rotation with automatic latching, for safety, at the 180° position. Hold-open arms are available for emergency ventilation where required. A tubular sash section is used, with the sash itself being easily removable from inside the building. The window is available with hopper or hopper insert. Both sash and frame can be assembled mechanically or by welding to assure permanently weathertight joints. All operating hardware is of nickel bronze and stainless steel. The window comes in all mechanical and electro-chemical finishes.

AIA FILE NO. 16-L

MFR: ALBRO METAL PRODUCTS CORP.
Circle 205 for further information

DOORS & HARDWARE

ALUMINUM SLIDING GLASS DOOR

MFR'S DESCRIPTION: a new *Daisy* aluminum sliding glass door which incorporates an entirely new single cadmium-plated steel roller and vinyl guide is announced.

USES: sliding door applications.

SPECS/FEATURES: mfr states that the roller, even in the largest and heaviest doors, will withstand the weight and frequent sliding action to keep the door's perfect "roll-abil-

ity." Also, to insure a smoother, easier and firmer sliding movement, the track groove has been increased 40 per cent in width. Other improvements include a new bar-type plunger lock in the "Prowler-Proof" ventilation feature, and an all-aluminum interlock is now used at the meeting stile for constant pressure seal and weathertight construction.

AIA FILE NO. 16-N

MFR: PETERSON WINDOW CORP.

Circle 206 for further information

AUTOMATIC LIGHT ON GARAGE DOOR OPERATOR

MFR'S DESCRIPTION: *Genie 400* automatic garage door operator, now includes an automatic light timed to remain on after the garage door is closed and the driver is safely inside his home.

USES: garage applications.

SPECS/FEATURES: the model automatically unlocks and opens or closes and locks any garage door by remote control radio and the push of the button. Both sectional and solid garage doors up to 8' by 20', can be handled by the unit, which employs a 1/3 hp motor. Although weighing only 32 pounds, the *Genie 400* opens and closes a garage door at the rate of one ft./lb. per second with 4 lbs. to 250 lbs. of pulling power.

AIA FILE NO. 27-C

MFR: THE ALLIANCE MANUFACTURING CO.

Circle 207 for further information



LIGHTER, STRONGER DOOR DEVELOPED FOR GARAGES

MFR'S DESCRIPTION: an insulating, plastic-impregnated fiber honeycomb flush door with a guarantee specifying that the panels will not rot, split or warp.

USES: residential and industrial applications.

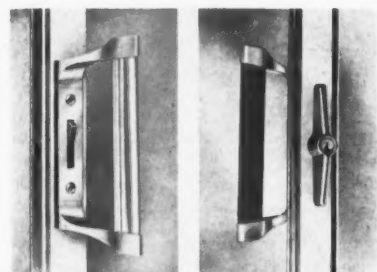
SPECS/FEATURES: called the *Stylist Flush Door*, the product has a plastic honeycomb core fitted within a redwood framework. The tempered hardboard paneling is hardened by being run through a hot roll press that forces oil into the surface. This

makes the paneling hard and weatherproof. Because of its flush surface the door provides complete latitude in decoration. It is available in 1", 1 3/8" and 1 3/4" thicknesses.

AIA FILE NO. 16-D

MFR: CRAWFORD DOOR CO.

Circle 208 for further information



OPTIONAL HARDWARE FOR SLIDING GLASS DOOR

MFR'S DESCRIPTION: optional deluxe hardware is available for *Challenger* sliding glass door.

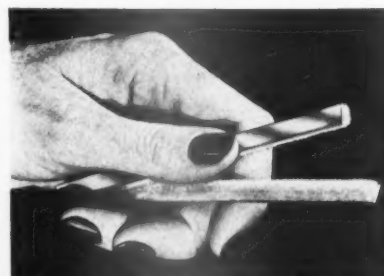
USES: sliding door applications.

SPECS/FEATURES: new door grip is offered in a choice of clear polished lucite or oil-finished hardware at slight additional cost. Mfr states door pull has graceful modern styling with a generous grip.

AIA FILE NO. 27-B

MFR: ADOR CORP.

Circle 209 for further information



ALUMINUM REINFORCED PILE WEATHERSTRIPPING

MFR'S DESCRIPTION: *R-Bond* woven pile weatherstripping is now available in an aluminum reinforced style for applications requiring additional structural rigidity.

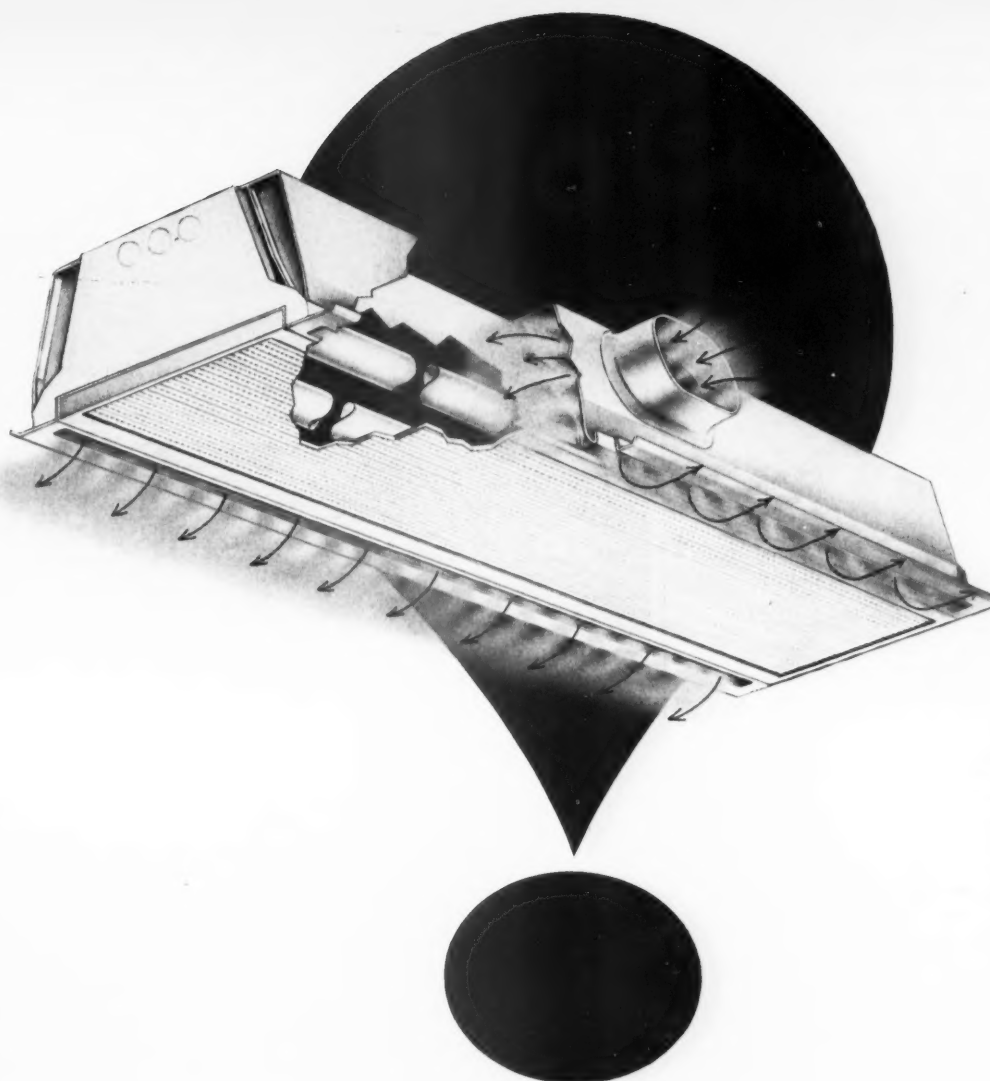
USES: weatherstripping doors and windows.

SPECS/FEATURES: a strong mechanical bond exists between the weatherstripping and the backing, making it impossible to separate the two. The product is rigid enough for rapid assembly in doors and windows and is virtually breakproof because of the high tensile strength of the metal. The woven pile is silicone treated to create a water repellent surface, and to increase the resiliency of the pile.

AIA FILE NO. 35-P-6

MFR: SCHLEGEL MANUFACTURING CO.

Circle 210 for further information



The fixture that leads 4 lives ...

VENTRO-LUX

it provides light • heat • cooling • ventilation

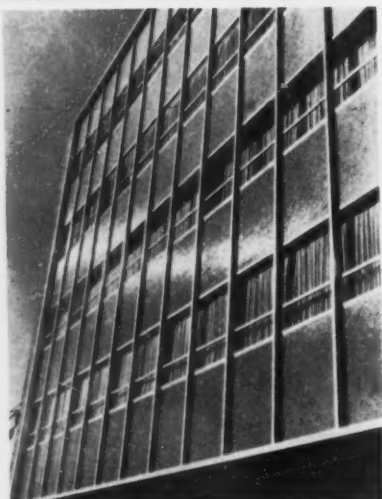
As part of a 10 year product development plan, Curtis AllBrite presents a new fixture, the Ventro-Lux with Anemostat air-diffuser. Four essential services are provided in this combined unit—excellent diffusion of light plus the optimum in heating, cooling and ventilation. The exclusive CALux lens provides effective concealment of lamps, high light output plus attractive appearance. The separate Anemostat air-diffuser handles a high capacity of air which it diffuses horizontally along the ceiling. Result—draft-free distribution, no hot or cold spots, no ceiling smudge. The Ventro-Lux is the first troffer to be combined with a high capacity air-diffuser. Since the Ventro-Lux and Anemostat units are installed separately there is no conflict in the trades. Curtis AllBrite Lighting, Inc., 6135 W. 65th St., Chicago 38, Ill.—352 Shaw Road, South San Francisco, Calif.—Toronto, Canada—Vancouver, B. C., Canada.



Circle 129 for further information

PRODUCTS, EQUIPMENT, MATERIALS

COMPONENT CONSTRUCTION



LIGHTWEIGHT CURTAIN WALL

MFR'S DESCRIPTION: a type of pre-fabricated lightweight curtain wall panel with a weatherproof exterior facing of ceramic tile.

USES: component construction.

SPECS/FEATURES: the panels are competitively priced with the better quality porcelain enamel panels. Combining lightweight (from 6 to 9 lbs. psf) and excellent structural strength, they offer the permanent beauty of ceramic tile in a wide range of colors and patterns, according to mfr. The panels are of laminated sandwich construction and utilize a variety of insulating cores, such as *Foamglas*, *Styrofoam*, and polyurethanes. The basic panel consists of a back or interior steel pan, galvanized and bonderized for permanent finish. The core is laminated to the interior of the pan and a facing sheet of cement asbestos board is then laminated to the exposed face of the insulating core forming a rigid panel of "stressed skin" construction.

ATA FILE NO. 17-A

MFR: STRUCTURAL PANEL CORP.

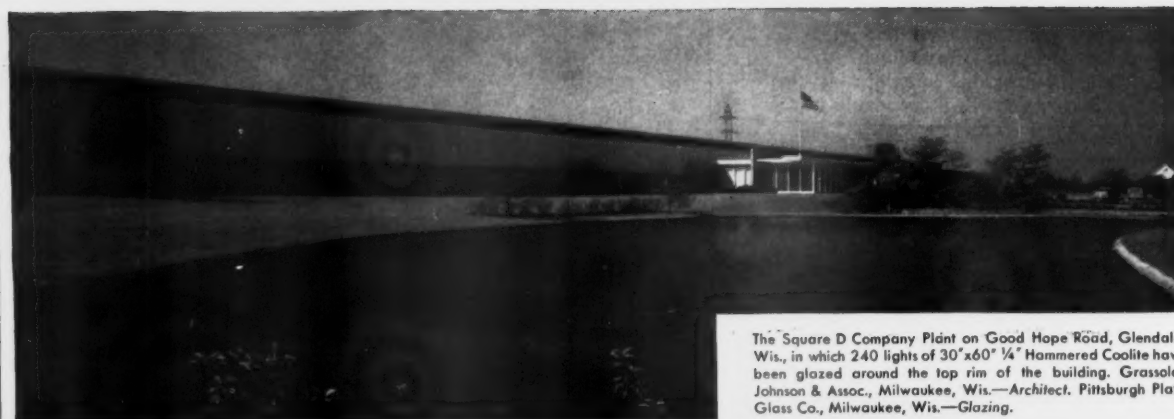
Circle 211 for further information

EXTERIOR PLYWOOD WITH COLORED ACRYLIC OVERLAY

MFR'S DESCRIPTION: exterior plywood with a permanently colored acrylic overlay.

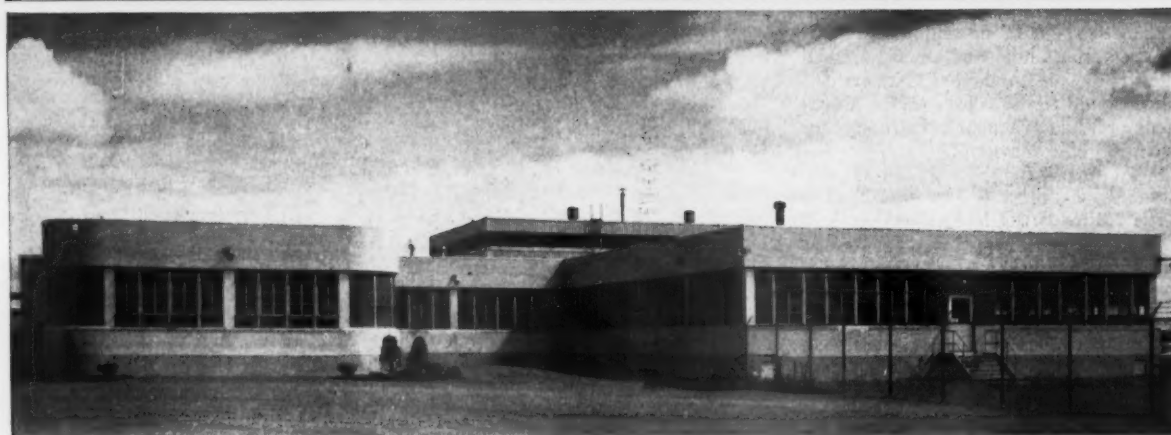
USES: fascias, feature walls or entire buildings.

SPECS/FEATURES: said by mfr to cost less and last longer than metal, and easily worked with standard wood-working tools, the paneling can be



The Square D Company Plant on Good Hope Road, Glendale, Wis., in which 240 lights of 30"x60" 1/4" Hammered Coolite have been glazed around the top rim of the building. Grassold-Johnson & Assoc., Milwaukee, Wis.—Architect. Pittsburgh Plate Glass Co., Milwaukee, Wis.—Glazing.

MISSISSIPPI GLASS...



Speer Carbon Company, Niagara Falls, N. Y. Laboratory glazed with 1/4" Luxlite Coolite, Glare Reduced One Side. Pilot house glazed with 1/4" Luxlite Coolite Wire Glass. Otto Preis, New York, N. Y.—Architect. Walter J. Johnson, Niagara Falls, N. Y.—Contractor. United Glazing Company, Buffalo, N. Y.—Glazing Contractor.



Borden Foods Company, Plymouth, Wis. South, east, and west elevations glazed with 1/4" Mississippi Luxlite Coolite, Heat Absorbing Glass. Cowell & Robinson, New York, N. Y.—Architects-Engineers. McDonough Construction Company of Georgia—Contractors.



WORLD'S LARGEST

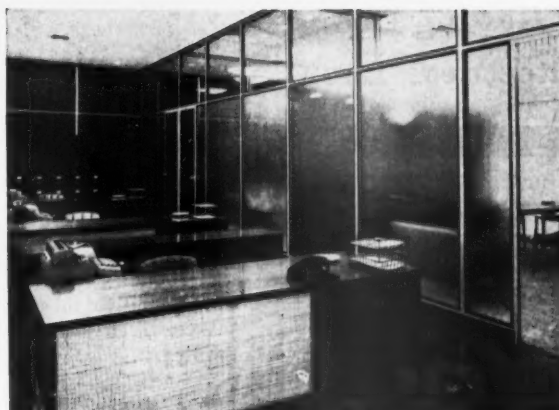
Architectural & Engineering News



I. B. M. Electric Typewriter Plant, Lexington, Kentucky, where 35,000 sq. ft. of $\frac{1}{4}$ " Luxlite Coolite, Glare Reduced, is installed. Fordyce & Hamby, Associates—Architecture and Engineering. Gilbane Construction Company—General Contractor. Pittsburgh Plate Glass Company, Lexington, Kentucky—Glass and Glazing.

... IN *Better* BUILDINGS EVERYWHERE

Pace setter in building progress, Mississippi glass helps achieve the ultimate in natural lighting . . . promotes truly functional architecture adapted to today's needs . . . offers a new dramatic texture that enhances the appearance of any structure. That's why today's leading architects are taking fullest advantage of translucent glass. Their outstanding buildings enjoy more and better daylighting per glazing dollar because translucent glass diffuses daylight deep into interiors to achieve even, comfortable, over-all illumination at low cost, and translucent glass helps create a feeling of spaciousness and comfort with resultant efficiencies and improved morale. For utility, beauty, and variety unmatched by any other glazing medium, specify Mississippi glass. Available in an exciting selection of patterns, wired and unwired, at better distributors everywhere.



Partitions of 7/32" Mississippi Factorlite Glass in Mutual Insurance Company of Hartford. Interior by Associated Designers for Interiors, Inc.

Write for new 1961 catalog. Address Department 18.



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NEW YORK • CHICAGO • FULLERTON, CALIFORNIA

88 Angelica Street • St. Louis 7, Missouri

MANUFACTURER OF ROLLED, FIGURED AND WIRED GLASS

Circle 130 for further information

April 1961

PRODUCTS, EQUIPMENT, MATERIALS

either a curtain wall material or an integral structural part of the building utilizing Douglas fir plywood's high weight-strength factor. The acrylic overlay has undergone extensive weather, abrasion, boiling water, checking and chemical solution tests, mfr points out. The panels require no on-the-job painting or other surface treatment. It is being manufactured in a wide variety of sizes and thicknesses. There is a choice of acrylic on both sides, or acrylic face with a back of high density natural or black overlay, or A or B fir.

AIA FILE NO. 19-F

MFR: GEORGIA-PACIFIC CORP.

Circle 212 for further information

ADHESIVE FOR CERAMIC CURTAIN WALL PANELS

MFR'S DESCRIPTION: MA-450 is a high-strength waterproof rubber base adhesive with non-oxidizing resins.

USES: installing ceramic tile on exterior work of all descriptions.

SPECS/FEATURES: according to mfr, MA-450 will bond to any rigid, dry, hard, clean surface. Recommended surfaces are concrete, metal, cement asbestos board (rough side), *Unarcoboard*, or other weatherproof material structurally strong enough to support the weight load. For prefabricated ceramic tile panels, cement asbestos board and metal are listed as preferred backings. Coverage is given as approximately 50 square feet per gallon, and open time up to one hour depending on temperature and humidity.

AIA FILE NO. 17-F-1

MFR: MIRACLE ADHESIVES CORP.

Circle 213 for further information

CURTAIN/WINDOW WALL INSULATED PANEL

MFR'S DESCRIPTION: *Soule'panel*, a decorative, insulated panel, is announced.

USES: for curtain and window walls. SPECS/FEATURES: product is a rigid, lightweight panel with a *Mosaica* finish bonded to its exterior face. *Mosaica* finish consists of glass chips of random sizes and shapes set in an inorganic matrix and laminated to cement-asbestos board. The finish is available in 17 different colors, and in either a facet or matte surface. The panel has a fiberglass insulating core backed with aluminum foil. Laminated to the core is a 3/16" cement-asbestos board with a *Mosaica* outer facing. The inner facing is also



HOME OF THE SAN FRANCISCO GIANTS



John S. Bolles, Architect E. Elmore Hutchison, Engineer

All 33 Front Doors at Candlestick Park Are Cookson...the Stronger Rolling Doors with the Compatible Architectural Look

Agreed that greater strength gives greater protection — against rough use, wind, weather, unauthorized entry, damage of any kind. That's why Cookson uses thick galvanized copper-bearing steel curtain slats of heavier gauge than most others, with deeper corrugations for added rigidity; and why Cookson has engineered its doors to resist a windload of 20 lbs. per square foot! Pure ruggedness is built into every other part, too, from the thick steel plate brackets to the continuous steel angle guides. Whatever the punishment, greater strength Cookson Doors can take it.

They're easier to operate than most other

doors, too. It actually takes 35% to 65% less effort to open or close a Cookson Door, because the barrel is supported by and rotates on grease-sealed ball bearings, and the oil tempered torsion springs are designed for the individual door, providing the correct counter-balancing force.

Whether you specify motor, chain or crank operation, you'll find Cookson Doors the smoothest to operate, the least expensive to maintain, the best looking to live with, year in and year out. See our catalog in Sweet's, or write for a copy. The Cookson Company, 1525 Cortland Avenue, San Francisco 10, Calif. Sales and service in principal cities.



COOKSON

ROLLING DOORS • FIRE DOORS • GRILLES • COUNTER DOORS • WOOD COILING PARTITIONS

Circle 131 for further information

52

PRODUCTS, EQUIPMENT, MATERIALS

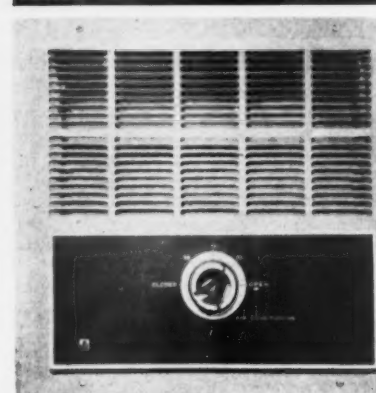
cement-asbestos board. Completing the panel assembly is an aluminum surround. In sizes over 9 sf, the panel is reinforced with galvanized steel stiffeners. Available in four thicknesses: 1", 1½", 1½" and 2" with respective U-factors of .32, .27, .20 and .14.

AIA FILE NO. 17-A

MFR: SOULE' STEEL CO.

Circle 214 for further information

HVAC



THERMOSTATIC REGISTER

MFR'S DESCRIPTION: use of thermostatic registers as part of a complete heating, air-conditioning and hot water system permits the furnace to run during the summer producing hot water without delivering hot air to the individual rooms.

USES: Jet-Heet warm air heating systems.

SPECS/FEATURES: the thermostatic register, which controls heat in individual rooms, has a range of 63° to 77° F. Although the system is started and stopped only by the usual centrally located main thermostat, all other rooms can be controlled at the temperature set on the register dial. The register with the control panel contains both the supply and the return, thus eliminating the need for conventional cold air returns. A special type wax, sealed in a capsule, expands and contracts with temperature fluctuations in the return air, opening and closing a specially designed supply shutter. No electrical connections are needed.

AIA FILE NO. 30-E, J

MFR: JET-HEET INC.

Circle 215 for further information

DUAL PURPOSE INDUSTRIAL VENTILATOR

MFR'S DESCRIPTION: model ER industrial ventilator combines functions as recirculator of heated air in winter and exhaust of hot air in summer

into a single compact unit.

USES: industrial applications.

SPECS/FEATURES: models range in size from 3,000 to 23,000 CFM. Mfr states model is easy to install and simple to operate. In the winter, a damper seals the top of the unit against winter heat loss. A three-position reversing switch controls the direction of the fan. On the recirculating cycle, the fan blows the air downward. On the exhaust cycle, during the summer, the fan blows the air upward, pulling hot air into its path and exhausting it outside the building.

AIA FILE NO. 30-D

MFR: GENIE-AIR PRODUCTS

Circle 216 for further information

REMOVABLE ENCLOSURES FOR AIR DIFFUSION UNITS

MFR'S DESCRIPTION: a complete line of removable under window enclosures for air diffusion units using a construction reported to be entirely new for this purpose.

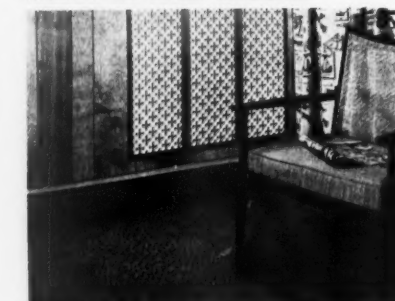
USES: air-conditioning systems on renovation jobs and new construction.

SPECS/FEATURES: enclosures are available in a great variety of finishes, including furniture steel, wood veneer, stainless steel and other custom surfaces, according to mfr. The panels are completely flush with no screws, locks, or handles visible. A specially designed access door eliminates the necessity of having "unsightly protrusions" from the surface of the enclosures.

AIA FILE NO. 35-H-6

MFR: BUENSOD-STACEY CORP.

Circle 217 for further information



LINE OF ELECTRIC BASEBOARD HEATERS

MFR'S DESCRIPTION: a line of modern "square silhouette" electric baseboard heaters.

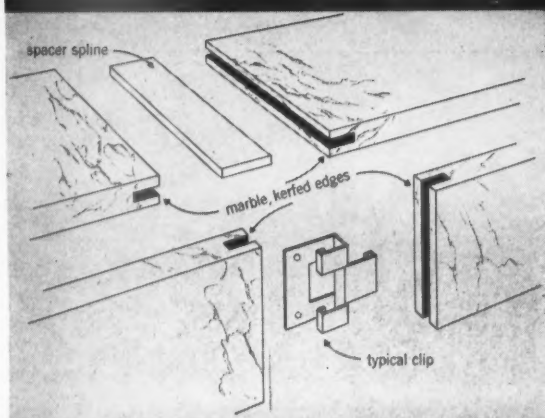
USES: room comfort heating.

SPECS/FEATURES: the line features safe, automatic thermal cutout, and Calrod heating units as standard equipment on all models. These units are reported to maintain uniform heat from floor to ceiling by convec-

Circle 133 for further information about U. S. RUBBER pp. 54-55 →

Architectural & Engineering News

DESIGN * Excitement WITH MARBLE



Here's a refreshing change of pace in flooring or wall facing. Marble strips 4" or 6" wide cut to standard or random lengths offer unlimited design possibilities. With more than 200 marble varieties to choose from, the architect can create subdued formal treatments or bright dramatic color accents. Installation can be simple and economical, too—here saw-cut kerfs in two edges accommodate spacer splines and clips. Or the marble strips can be combined with polished metal dividers. You'll see more marble everywhere these days, used in new and more imaginative ways by today's most creative architects.

MARBLE INSTITUTE OF AMERICA, INC.

32 SOUTH FIFTH AVENUE, MOUNT VERNON, NEW YORK



Circle 132 for further information

TROPICEL acrylic sandwich panels

Beautiful new way to work with light!

TROPICEL[®] is the trademark for a family of highly styled, and *highly practical*, translucent sandwich panels that have opened a whole new field of structural and decorative architectural possibilities.

The new Lucite[®] 100% acrylic resin of which they are made provides a combination of translucency, color stability, strength, and general weather resistance that is exceptional . . . not only when compared with other plastic materials, but with conventional building materials as well.

Tough, shatterproof TROPICEL panels withstand the winds and even the air-borne debris of hurricanes, are unharmed by temperatures ranging from arctic to tropical, have excellent resistance to abrasion and chemical attack.

Most important, as a result of the 22 Cathedral colors available, is the wide variety of strikingly beautiful 3-dimensional color effects possible. These colors present new horizons in the imaginative use of light.

*Registered T. M. of E. I. DuPont De Nemours & Co.



CARPENTER HOTEL, Manchester, New Hampshire. Main entrance has outdoor Surround of TROPICEL in Circllet pattern.



1961 ROOM OF TOMORROW. Patio roof of Mosaic TROPICEL. Translucent white panels with yellow and orange cells form louvers which are adjustable to provide maximum control over weather and sunlight. Designed by Marion Heuer.



HOTEL NEWBURGH, Newburgh, New York. New dining area has partitions of Mahogany Woodcurl TROPICEL. Major source of lighting is concealed behind panels.



GENERAL FIREPROOFING COMPANY. Background panels of Woodcurl TROPICEL further enhance the luxurious yet practical look of this special executive furniture arrangement, here featuring the *Italic Group*. Designed by GF Studios, Inc.

USES

The use of Lucite acrylic resin, the plastic material which over the years has proved its excellent weathering properties throughout the automotive and aviation industries, makes TROPICEL equally adaptable to outdoor or indoor applications. For practical purposes, it may be used wherever glazing material is indicated.

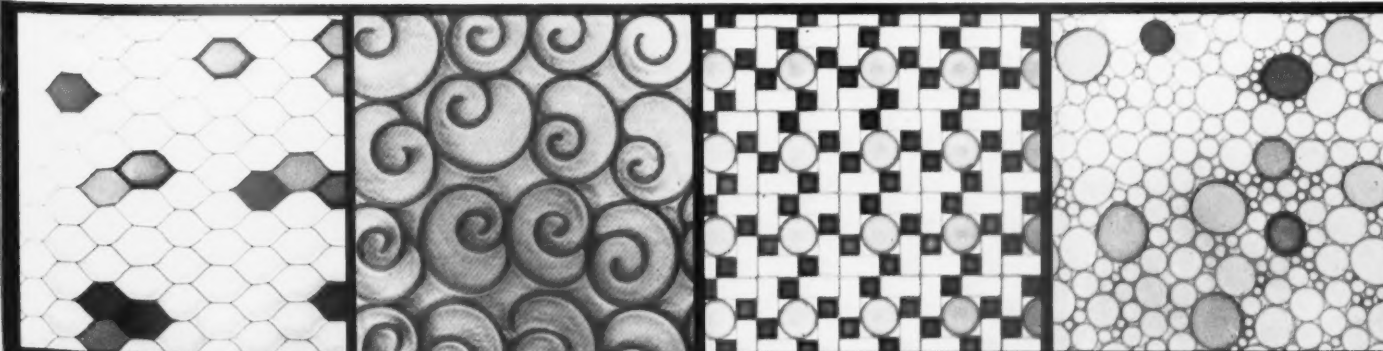
Among the applications to which TROPICEL recommends itself are: fenestration of all kinds . . . interior and exterior wall panels . . . room dividers . . . table and furniture surfaces . . . curtain wall constructions . . . skylights . . . ceilings . . . lighting diffusers . . .

ADVANTAGES

Among the many reasons you will want to use TROPICEL soon and often are:

- singularly striking color effects
- excellent thermal insulating value
- exceptional strength and rigidity
- almost complete lack of maintenance
- soft, diffused light control
- practical durability
- lasting economy
- unusual versatility of application
- ease of installation by standard methods
- desirable acoustical properties

Here are 4 of the 6 basic types of TROPICEL core patterns, each of which may be widely varied by the choice and use of color.



United States Rubber

NAUGATUCK CHEMICAL DIVISION

NAUGATUCK, CONNECTICUT



... find ready utilization
in ambitious Detroit
urban-renewal project!

Design for Living, City-Style—Mies van der Rohe's Lafayette Park Development in downtown Detroit. Mahon Long-Span M-Deck was used as the roof system in all 22 low-rise building units. Contractor: Herbert Construction Co., Chicago

Architects and engineers know Mahon Long-Span M-Decks as a valuable ally in curbing construction costs without sacrificing design expression. M-Decks are proven, multi-purpose roof sections that can be functionally used in a variety of ways—even as a *combined structural roof deck and ceiling system*. Why not find out how space-spanning (truss-to-truss) M-Deck can help you ... your projects ... your costs? Call in your local Mahon architectural representative or write for the new catalog LSD-61.

THE R. C. MAHON COMPANY Detroit 34, Michigan

Manufacturing Plants—Detroit, Michigan
and Torrance, California

Sales-Engineering Offices in Detroit, New York,
Chicago, Torrance and San Francisco
Representatives in all principal cities.

SPEEDING AMERICAN CONSTRUCTION WITH
METAL BUILDING PRODUCTS, FABRICATED
EQUIPMENT AND ERECTION SERVICES

MAHON

Circle 134 for further information

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MAHON LONG SPAN M-DECK SECTIONS

Standard M-Deck types now
in manufacture by Mahon.
Special form sections can also
be supplied.



MAHON BUILDING PRODUCTS

- Aluminum or Steel Curtain Walls
(in natural or colored metals)
- Rolling Steel Doors (Standard
or Underwriters' labeled)
- Metalclad Fire Walls
(Underwriters' rated)
- M-Floors (Steel Cellular
Sub-Floors)
- Long Span M-Deck (Cellular or
Open Beam)
- Steel Roof Deck
- Acoustical and Troffer Forms
- Acoustical Metal Walls,
Partitions and Roof Decks
- Permanent Concrete Floor Forms

CONSTRUCTION SERVICES

- Structural Steel-Fabrication
and Erection
- Steel Fabrication-Weldments
- Geodesic Domes—Fabrication
and Erection

PRODUCTS, EQUIPMENT, MATERIALS

tion and radiant warmth, and are used with flexible room-by-room temperature controls. Their clean, simple design lets them hug flush to wall, or they can be semi-recessed, states mfr. The safety protector cut-out runs the entire length of the heater and controls the heat if the front of the unit is blocked at any point. The unit returns to normal operation when the blockage is removed. The *Calrod* units are metal enclosed and operate at safe, low temperatures. Continuous steel radiating fins welded directly to the heating units speed heat recovery throughout a room. All heaters are six inches high, two inches deep, and are available in three, five and eight foot sections which can be joined together at either end. UL listed.

AIA FILE NO. 30-C-44

MFR: ELECTRIC COMFORT HEATING SECTION, GENERAL ELECTRIC CO.

Circle 218 for further information



INFRARED HEAT FOR BATHROOMS

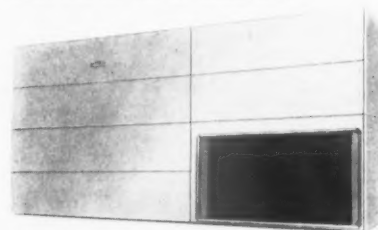
MFR'S DESCRIPTION: *Quartztone* bathroom heater is designed to provide personal focused warming comfort. USES: bathrooms, nurseries, porches, etc.

SPECS/FEATURES: finish is beige with a chrome finish. Available in 120 or 240 V with 800 W capacity. Measures 24" long by 5" wide by 6" high. Operates from a wall switch.

AIA FILE NO. 30-C-44

MFR: ELECTROMODE DIV., COMMERCIAL CONTROLS CORP.

Circle 219 for further information



CENTRAL STATION AIR-COOLED AC UNIT

MFR'S DESCRIPTION: 30-ton *RK-30AC*, a compact central station, air-cooled air conditioner with new styled integral condenser, is announced.

USES: industrial and commercial applications.

SPECS/FEATURES: features include dual circuit semi-hermetic compres-

sors which operate individually or automatically together for full capacity; horizontally split evaporator coil which is effective where load variations require 50 per cent capacity control or where dehumidification is needed at reduced operating capacity. An optional built-in modulating head pressure control is available for low outside air conditions. If desired, the unit can be furnished in two sections for remote location of the condenser. After a 16-hour test run, the assembly is shipped ready for immediate installation.

AIA FILE NO. 30-F-2

MFR: U. S. AIR CONDITIONING CORP.

Circle 217 for further information

CENTRAL PLANT HVAC SYSTEM

MFR'S DESCRIPTION: *Combinex* system is heating and air-conditioning system which utilizes hot and chilled water from a central plant.

USES: hotels, motels, apartments, hospitals, and office buildings.

SPECS/FEATURES: units are available in wide selection of capacities and features. They can be mounted straddling the wall, flush mounted, or installed to deliver air into a distribution plenum formed by a dropped ceiling. In heating cycle, return air is withdrawn at the floor level and discharged at the ceiling; for cooling, return air is withdrawn at the ceiling level and discharged at the floor. This system is intended to produce a comfortable, steady flow of air.

AIA FILE NO. 30-C

MFR: KRITZER PRODUCTS

Circle 221 for further information

LIGHTING UNITS



LOW-STANDING OUTDOOR FLUORESCENT UNIT

MFR'S DESCRIPTION: *Terrace-Lite* is low-standing outdoor fluorescent lighting fixture.



There's no waste with a PYREX® drainline

No installation waste. The new one-nut joint on PYREX® "double-tough" drainline speeds installation, saves dollars and days.

No corrosion waste. Pour whatever you like down a PYREX drainline—it's resistant to more acids and acidic materials than any other drainline.

No maintenance waste. It neither leaks

nor corrodes, so maintenance costs flush away. Should someone drop something down a drain or plug it up, you can spot the trouble visually.

If you want more reasons for specifying PYREX drainline, we've got a bulletin. Write for a copy of PE-30. Plant Equipment Department, 4403 Crystal Street, Corning, N. Y.



CORNING GLASS WORKS

CORNING MEANS RESEARCH IN GLASS

See our exhibit at the A.I.A. Convention, Booth 9

Circle 135 for further information

← Circle 133 for further information about U. S. RUBBER pp. 54-55

April 1961

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PRODUCTS, EQUIPMENT, MATERIALS

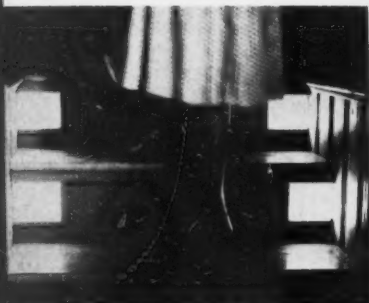
USES: illumination of entrances, walkways, driveways, patios, pools and around shrubbery.

SPECS/FEATURES: made of aluminum, the fixture is available in six colors and three heights—18", 30" and 48". Mfr states fixture has low initial cost and provides power savings over comparable incandescent types.

AIA FILE NO. 31-F-22

MFR: STERNER INDUSTRIES

Circle 222 for further information



ELECTROLUMINESCENT SAFETY STEP LIGHTS

MFR'S DESCRIPTION: known as the *Rayescent Safety Step Light*, it can be mounted nearly flush on existing stair risers.

USES: lighting for steps, aisles and walks.

SPECS/FEATURES: the stair light is two-dimensional in shape, permitting it to be mounted on existing stairways with little or no carpentry or alterations. Measuring 4" x 8" x 1/2", the light is competitive in price to old style box type units, according to mfr.

AIA FILE NO. 31-F-29

MFR: LAMP DIV., WESTINGHOUSE ELECTRIC CORP.

Circle 223 for further information



SHALLOW-DEPTH FLUORESCENT FIXTURES

MFR'S DESCRIPTION: series *S16* line of fluorescent surface lighting fixtures are completely enclosed, yet less than 3 1/2" deep.

USES: ceiling illumination in commercial, institutional and industrial applications.

SPECS/FEATURES: units feature a wrap-around prismatic diffuser ex-

Circle 136 for further information →



Presenting

Vina-Lux®

PREMIERE *Series*

*A style achievement which begins a new era
of classic elegance in vinyl asbestos floor tile*

Now from Azrock... an artistic achievement in vinyl asbestos tile which brings custom floor styling within reach of virtually any flooring budget. Vina-Lux Premiere Series has the luxurious, subtle patterning of expensive flooring — at the same price as regular vinyl asbestos tile.

Durability, too — Premiere beauty is more than "skin deep." It can be specified with confidence for heavy-traffic commercial and institutional areas because the pattern is evenly distributed throughout the *full thickness* of the tile — it is not a surface decoration. It can be installed over concrete — above, on or below grade; or over wood or plywood subfloors. And like all Vina-Lux, Premiere is grease proof, alkali resistant, economical to maintain.



Available in 9" x 9" size; 1/8", 3/32" and 1/16" gauges; seven magnificent colors, including two metallics. Consult your flooring contractor or write us for samples and complete specifications.

AZROCK FLOOR PRODUCTS DIVISION

Specialists in the manufacture of vinyl asbestos tile and asphalt tile flooring.

UVALDE ROCK ASPHALT CO. • 508 A FROST BANK BLDG. • SAN ANTONIO, TEXAS



Circle 136 for further information

PRODUCTS, EQUIPMENT, MATERIALS

truded from clear polystyrene. End plates offered in gold anodized aluminum or enameled steel. Two and four-light units are available for individual mounting or in continuous runs. Housings are constructed of cold-rolled steel, die-formed in 4' and 8' lengths.

AIA FILE NO. 31-F-21

MFR: LITECRAFT MANUFACTURING CORP.

Circle 224 for further information



EXIT LIGHTS FOR VARIED MOUNTINGS

MFR'S DESCRIPTION: *Multi-Mount* line of exit lights announced.

USES: commercial, industrial and institutional applications.

SPECS/FEATURES: exit lights can be used with three lamp sources—incandescent, fluorescent or electroluminescent. In mfr's electroluminescent exits, the electroluminescent panel itself is the source of illumination. Units can be mounted in varied ways: recess, surface, top or end mounting, and triangular. End, top mounted and triangular exits include double faces. Exits are furnished with either cut-out metal letters or all-glass face plates.

AIA FILE NO. 31-F-27

MFR: EDWIN F. GUTH CO.

Circle 225 for further information



ONE-PIECE PLASTIC FLUORESCENT LUMINAIRE

MFR'S DESCRIPTION: new *White Cloud* fluorescent luminaire has one-piece construction and is completely luminous on all sides and ends.

USES: schools, department stores, offices, institutions, and other large lighting areas.

SPECS/FEATURES: units may be surface or semi-recessed mounted. The channel and wireway are die formed of 20 ga. steel and electrically welded throughout. Two jack chains permit

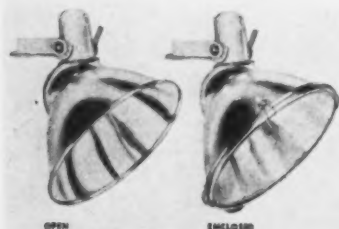
PRODUCTS, EQUIPMENT, MATERIALS

the wireway to hang suspended below the channel for ease and speed in installation or repair. One-piece diffuser made of pure white polystyrene, fits snugly into the channel with no end plates or other parts required. Ample knockouts in the channel provide for individual or continuous mounting and wiring. Ballasts are CBM certified and UL approved.

AIA FILE NO. 31-F-21

MFR: SOLAR LIGHT MANUFACTURING CO.

Circle 226 for further information



MORE USABLE LIGHT IN FLOODLIGHT DESIGN

MFR'S DESCRIPTION: *Econoflood* floodlights have an exclusive auxiliary inner floating reflector providing more usable light heretofore trapped in floodlight socket housing.

USES: sports areas, parking lots, outdoor work and storage areas, etc.

SPECS/FEATURES: elimination of all screws in reflector surfaces provides more usable light per lighting dollar. Five efficient beam spreads provide a line of floodlights for all applications. According to mfr, the *Econoflood* cuts cost eight ways: 1) long service life is assured with one-piece weathertight aluminum hood; 2) more usable light from laboratory design tested alzak aluminum reflector systems; 3) duo relamping design—relamps from front or rear; 4) locked in aiming design; 5) no tools required to "swing-over" for rear maintenance; 6) utilizes low priced incandescent lamp or long lived mercury lamp; 7) wide range of mounting accessories—base, pole pipe, vertical surface; 8) wide range of beam spreads from 18° to 100°.

AIA FILE NO. 31-F-22

MFR: APPLETON ELECTRIC CO.

Circle 227 for further information

DEVELOPMENTAL LAMP USING SYNTHETIC CERAMIC

MFR'S DESCRIPTION: laboratory development of an unusual light source that combines high light output with extremely favorable color quality is announced.

Get two-way corrosion resistance plus greater strength

VIN-COR...new vinyl protected



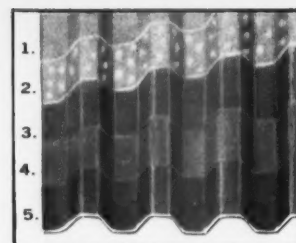
Permanent Protection

Won't Chip or Peel

Withstands Fumes

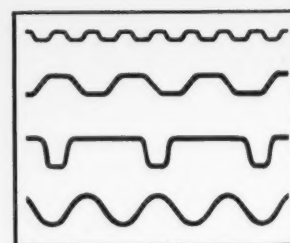
Granco Vin-Cor is a new concept in protected metal—corrugated steel panels protected on both sides by a generous galvanized coating, plus a tough three-coat vinyl finish. *Permanent protection* against weathering and corrosive atmospheres. *Permanent color* proved by Weatherometer tests. Vin-Cor's durable vinyl surface requires no maintenance. Won't craze, chip or peel. The zinc coating provides important secondary galvanic protection when Vin-Cor is drilled or cut.

Granco Vin-Cor is made from tough-temper steel. Strong. You can specify lighter gages than ordinarily required or use fewer supports. Reduce costs. Vin-Cor is classified noncombustible by NFPA Std. No. 220.



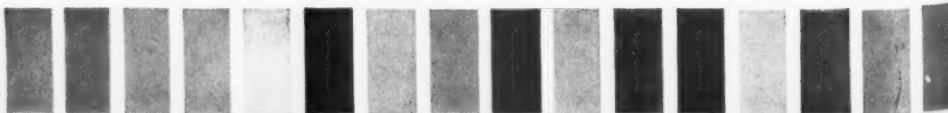
FOUR INDEPENDENT CORROSION-RESISTANT COATINGS

1. Steel • 2. Zinc • 3. Prime Coat
4. Vinyl Coat • 5. Vinyl Finish Coat



WIDE VARIETY OF PATTERNS AND GAGES IN ANY LENGTH TO 12' 0"

Granco Vin-Cor is available in the widest variety of beautiful, nonfade colors ever offered in a protected metal. Furthermore, you can have a different color on opposite sides of the Vin-Cor panel!



Circle 137 for further information

ter strength, beauty and economy with...

ed galvanized steel panels



VIN-COR

VINYL PROTECTED STEEL PANELS

The new protected metal for industrial and commercial construction—siding, roofing, insulated wall panels, fascia, canopies and other applications.



Cofar®
Corralform®
Tufcor®
Roof Deck
Utility Deck
Structur - Acoustic
Stay-In-Place Bridge Forms
Guard Rail
Pavement Joints



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NAME _____

OUR CATALOGS ARE FILED IN SWEET'S!

Circle 137 for further information

PRODUCTS, EQUIPMENT, MATERIALS

USES: industrial, commercial, defense, street lighting and other outdoor applications.

SPECS/FEATURES: these developmental lamps are metallic vapor types which fall into the family of electric discharge lamps. They are the first to use thin, tubular envelopes made of mfr's polycrystalline alumina ceramic, *Lucalox*. The qualities of *Lucalox* permit the use of alkali metal vapors at higher pressures and temperatures than were ever before practical, according to mfr.

AIA FILE NO. 31-F-21

MFR: GENERAL ELECTRIC CO.

Circle 228 for further information

PLUMBING EQUIPMENT

HEAVY DUTY ELECTRIC WATER HEATER

MFR'S DESCRIPTION: *Marathon* heavy duty electric water heater is offered. USES: residential applications.

SPECS/FEATURES: water tank is made of 1/4" steel in either galvanized or glasslined finish. Wattages available up to a maximum of 12,000. Standard voltage is 236 v., or 208 v., when desired. Carries a 25-year warranty.

AIA FILE NO. 29-D-2

MFR: W. L. JACKSON MANUFACTURING CO., INC.

Circle 229 for further information



SURGEON'S LAVATORIES WITH FLEXIBLE TRIM AND SUPPORTS

MFR'S DESCRIPTION: two surgeon's lavatories—one a flat slab model and the other with a 4-inch back—have been announced.

USES: many hospital locations.

SPECS/FEATURES: made of one-piece vitreous china, the lavatories are of-



Your New 1961 Data on ... **Kinnear Rolling Doors**

In any doorway, Kinnear provides an unbeatable combination of lower door costs, extra protection and higher efficiency. Kinnear's upward-acting curtain of interlocking slats (originated by Kinnear!) coils compactly above the opening. All space around doorways is fully usable at all times. The curtain opens completely out of the way, closes to give you a rugged all-metal curtain of protection against wind, weather, fire, and vandals. 50 years and more of continuous, daily, low-maintenance service have been recorded for many Kinnear Rolling Doors. They're also REGISTERED — all parts of every Kinnear door can always be accurately duplicated from master details kept permanently in fireproof vaults. Get all these Kinnear Rolling Door benefits and more; write for this new 1961 catalog.

The KINNEAR Manufacturing Co.

FACTORIES: 1240-60 Fields Ave., Columbus 16, Ohio
1742 Yosemite Ave., San Francisco 24, California
Offices and Agents in All Principal Cities

Circle 138 for further information

**and rolling grilles,
counter shutters
and fire doors**



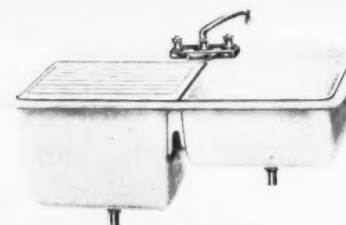
PRODUCTS, EQUIPMENT, MATERIALS

ferred with a large variety of trim arrangements and supporting methods, concurring with modern hospital usage. Overall size is 28" x 20", with a bowl size of 12" x 14". To provide the maximum area on each side of the lavatory bowl for instrument trays, the deck area slopes toward the bowl from the top edge of the outside rim. Besides permitting larger trays, this generous deck area makes the lavatory convenient for use throughout the hospital. These units are the only ones that can be supported with a concealed arm chair carrier. The model with the back is also available with a china pedestal.

AIA FILE NO. 29-H-6

MFR: PLUMBING & HEATING DIV.,
AMERICAN STANDARD

Circle 230 for further information



ENAMELED CAST IRON USED IN SINK & TRAY

MFR'S DESCRIPTION: a sink and tray with ledge made of cast iron coated with acid-resisting enamel.

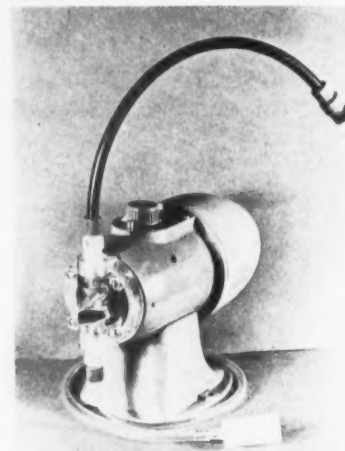
USES: mfr stresses suitability for federal and city housing projects because product conforms to public housing specifications.

SPECS/FEATURES: the sink and tray with ledge has an overall measurement of 42" x 21". Designed for installation with a standard mounting frame, it can be fitted with either centerset or single lever faucet, with or without soap dish. Both the sink and tray compartment measure 18 $\frac{3}{8}$ " x 13 $\frac{3}{4}$ ". The sink compartment, which is available on either the left or right of the tray, is 8" deep; the tray compartment is 13" deep. An enameled steel sliding drainboard is available for use with the sink and tray combination.

AIA FILE NO. 29-H-6

MFR: PLUMBING & HEATING DIV.,
AMERICAN STANDARD

Circle 232 for further information



SOLUTION FEEDER FOR WATER SYSTEMS

MFR'S DESCRIPTION: Model 20 electric feeder is designed to introduce small amounts of chemical solution into a water system.

USES: home and commercial water systems, cooling towers and swimming pools.

SPECS/FEATURES: feed rate is adjustable from 2.4 to 20 gallons per day by means of a fingertip control knob. Positive treatment is assured at any pressure from suction to 100 psi pressure, mfr states. No external anti-siphon valve is required because this feature is built into the pump head. All exposed parts are constructed of high impact plastic for long, corrosion-free performance. A compact, heavy duty, 115 v. motor powers the feeder. Can be installed indoors or outdoors.

AIA FILE NO. 34-G

MFR: BRUNER CORP., DIV. HAGAN
CHEMICALS & CONTROLS, INC.

Circle 231 for further information

LOW-COST BRONZE GATE VALVE

MFR'S DESCRIPTION: the Compact, model No. 300, is a full bodied valve with a guaranteed full opening for complete, unrestricted passage at full flow.

USES: all systems where a valve with 125 WWP rating is required.

SPECS/FEATURES: mfr emphasizes low cost of this valve. "O" ring packing is included at no extra cost. It is available in six sizes: $\frac{1}{2}$ ", $\frac{3}{4}$ ", 1", 1 $\frac{1}{4}$ ", 1 $\frac{1}{2}$ ", and 2".

AIA FILE NO. 29-B-4

MFR: AMERICAN VALVE MANUFACTURING CO., INC.

Circle 233 for further information

PLASTIC PIPE COMPOUNDS IN RANGE OF COLORS

MFR'S DESCRIPTION: PVC plastic pipe compounds are now available in colors to match needs of individual requirements, in addition to conventional gray pipe color.

USES: joining plastic pipes of all sizes.

SPECS/FEATURES: compounds available in drying speeds to meet the particular requirements of small or

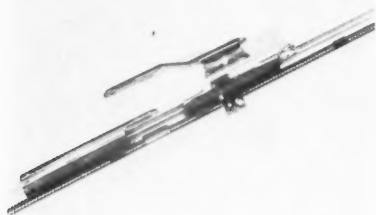
large section bonding. Product is based on pure, unmodified and unplasticized polyvinyl chlorides that provide chemically resistant bonds with the pipe properties. They dissolve pipe and fitting surfaces to form a fused, inseparable, permanent bond. When hardened, the bond is integral with the pipe. The result is a bond that resists acids, alkalis, water, gasoline and oils.

AIA FILE NO. 29-B-8

MFR: SCHWARTZ CHEMICAL CO., INC.

Circle 234 for further information

ELECTRICAL DEVICES



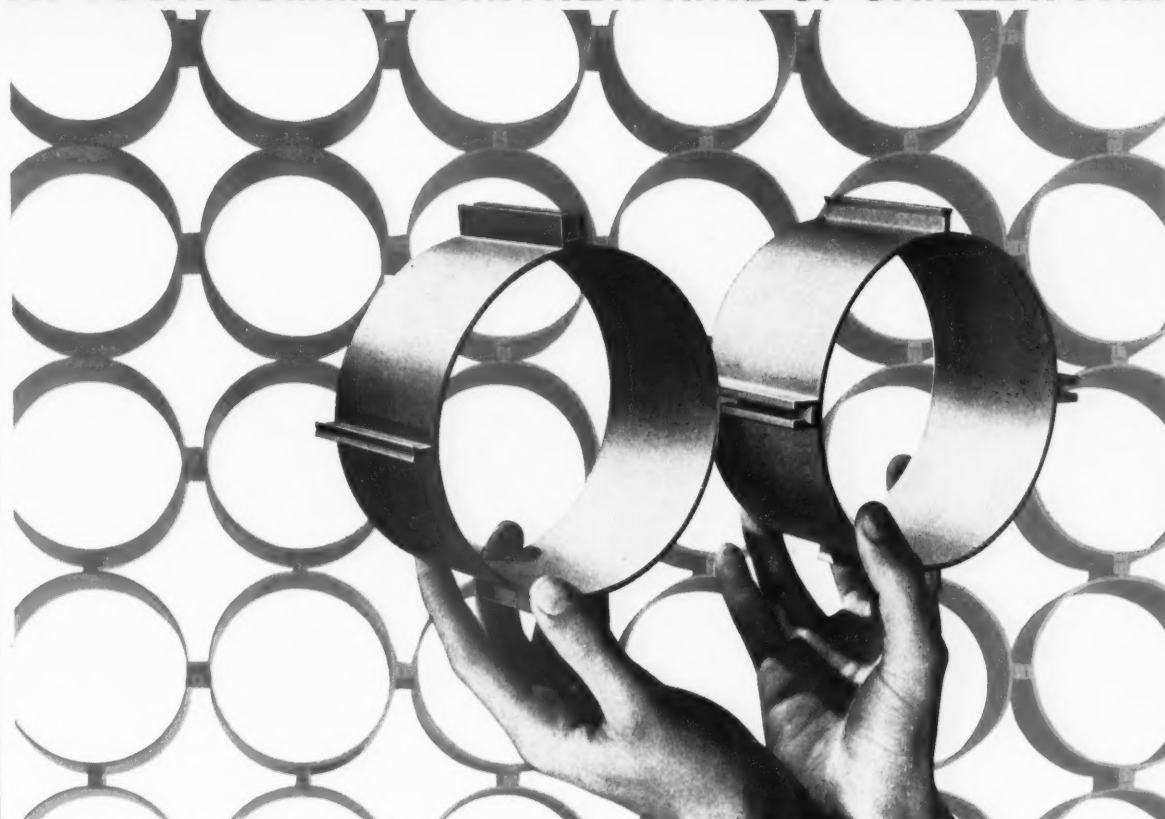
ELECTRIC TRAVERSE ROD

MFR'S DESCRIPTION: a completely integrated electric remote drapery control system.

USES: residential, industrial, commercial and institutional applications.

SPECS/FEATURES: three separate units are integrated into one remote control system: the track assembly; the power supply; and the electrical control system. The track assembly is extruded aluminum available in one of three decorative finishes: gold anodized; platinum anodized; white baked enamel on all visible parts. General Electric wall plates are available in either the *Decorator* or *Smooth* series and in brown or ivory color. Units are available in two-way, one-way, double two-way, plain and traverse two-way, and valance and traverse set, with single or dual power supply, left-to-right or right-to-left draw. Mountings are for ceiling, recess ceiling and wall with brackets. Model ET-1 will handle draperies of light, medium or heavy

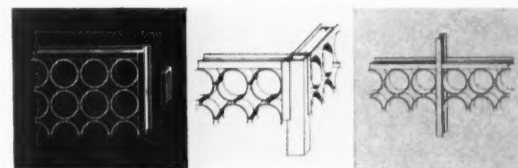
AT YOUR COMMAND...A NEW KIND OF GRILLEWORK



GRILLEWALL*...light...lacy...elegant

First non-modular aluminum grillework—here is a new design element of limitless application that lends classic lightness and elegance to contemporary architecture and at the same time provides cost-saving light and heat control. Grillewall features a new self-assembly concept which totally eliminates riveting, welding and all visible bolted connections. It is fully capable of stretching the entire height and width of a multi-story building without the interruption of any intermediate framing members. Grillewall's physical characteristics have been exhaustively pre-tested and full architectural details and test results are available. As a basic and versatile element in design, Grillewall produces the feeling and simplicity of custom architecture—yet is within the range of mass-production cost.

✶ GRILLEWALL—by the originators of INFINILITE, the luminous plastic grillework of infinite dimension. Write for the new GRILLEWALL eight-page Catalog today.



GRILLEWALL*

* REGISTERED TRADEMARK—PATENTS APPLIED FOR

a product of Integrated Ceilings & Grilleworks, Inc.

INTEGRATED Ceilings & Grilleworks, Inc. AEN
11766 W. Pico Blvd., Los Angeles 64, Calif.

☐ Send new Grillewall catalog.

☐ I have a project on the boards—please rush information at once.

Name _____

Firm _____

Address _____

City _____ State _____

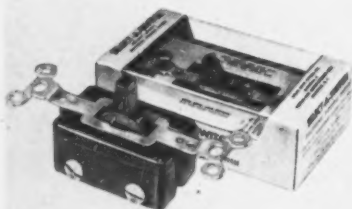
Circle 139 for further information

PRODUCTS, EQUIPMENT, MATERIALS

weight providing the heading is not too bulky or stiff. Heavier draperies may be accommodated by a special installation which is available from the mfr.

AIA FILE NO. 27-C

MFR: KENNEY MANUFACTURING CO.
Circle 235 for further information



DIMMER SWITCH FOR RESIDENTIAL USE

MFR'S DESCRIPTION: *Select-A-Switch* is offered as moderate-cost light dimming switch.

USES: residential applications for unusual lighting effects, TV viewing, or savings in power when rooms are not in full use.

SPECS/FEATURES: device employs a non-wearing electronic component rather than rheostat or transformer to step-down power. Approved for 400 w. incandescent lighting control, mfr states product can replace existing standard single-pole switches and is just as easily installed. Switch offers: 100 per cent—off—30 per cent lighting ranges. It uses approximately 60 per cent less power when in low position and operates on 115/125 v., ac. List price is \$6.95.

AIA FILE NO. 31-D-49

MFR: SOLAR SONIC DEVICES, INC.
Circle 236 for further information



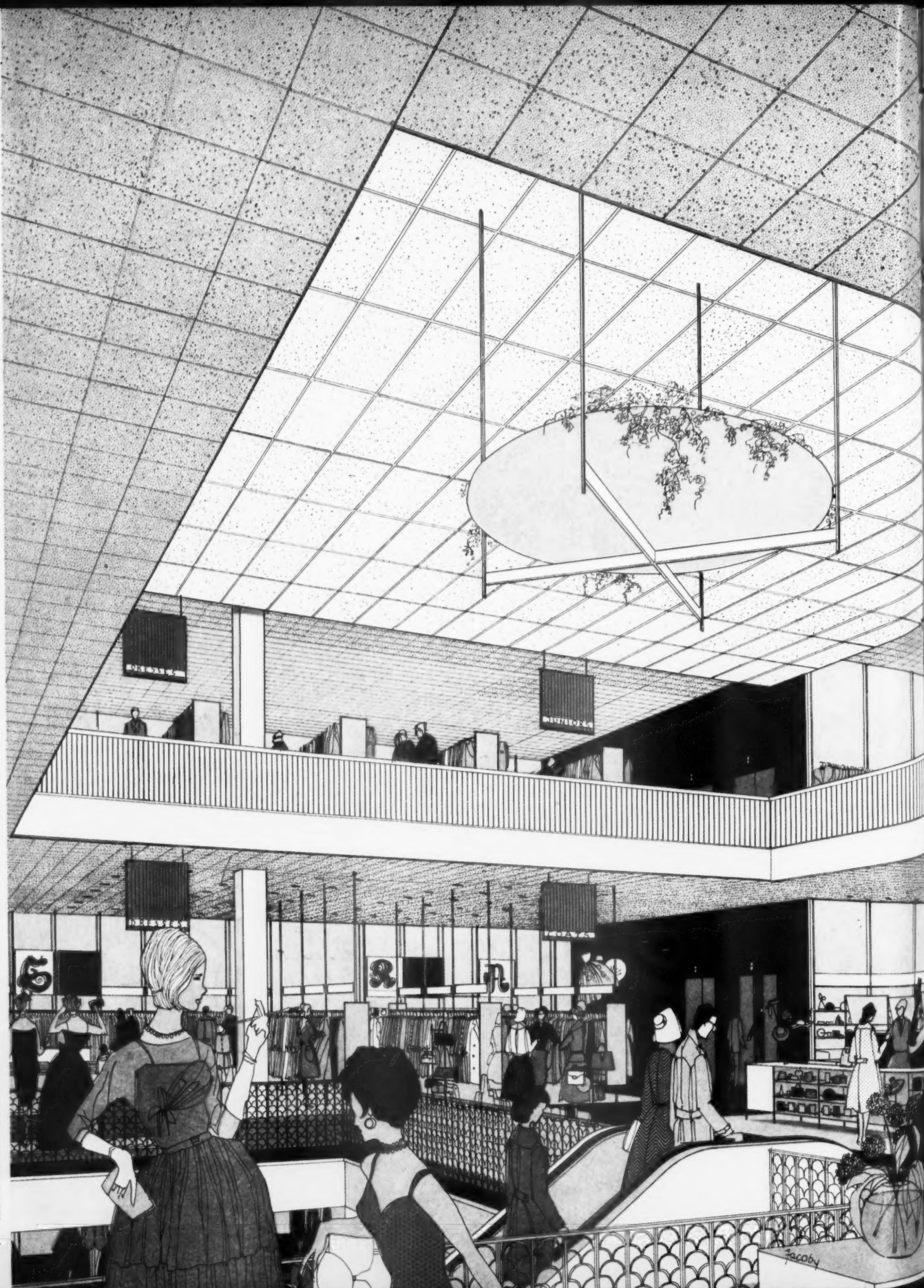
EXPLOSION-PROOF RECEPTACLE & PLUG

MFR'S DESCRIPTION: an explosion-proof electrical receptacle and plug which prevent arcing when appliances are connected or disconnected at wall outlets.

USES: Class I, Group C and D, explosive atmospheres in industrial plants and hospital operating rooms.

SPECS/FEATURES: to prevent explosive gases or fluids from accumulating inside the plug, the *Hubbellock* plug is designed so that a self-

Circle 140 for further information →



From Armstrong: a giant step in fire-retardant ceilings

**Now, for department stores: two types
of Acoustical Fire Guard—12" x 12" tiles
and new lay-in units**

The larger ceiling area of the department store on the left has the new Acoustical Fire Guard lay-in ceiling. The smaller first floor ceiling, which you see just below the mezzanine, is of Acoustical Fire Guard tile.

Introduced by Armstrong two years ago, this was the first time-design-rated acoustical tile. Since then, millions of square feet of these tiles have been installed.

The new lay-in system marks another great advance in fire-retardant ceilings, with these advantages to architects, builders, and clients.

Safety with Speed and Economy

The Armstrong Acoustical Fire Guard lay-in ceiling features a unique type of suspension. With this suspension system, the advantages of an exposed grid system—economy and fast installation—are combined with the advantages of a time-design-rated acoustical ceiling. Here's how the lay-in units work with the specially designed Fire Guard Grid Suspension System* to protect the structural components of a building.

Revolutionary Expandable Grid

The lay-in unit—because of its composition—can withstand exposure to flames and 2,000-degree heat. The new grid system designed exclusively to support these units will resist this same intense heat by accommodating the expansion of its members when exposed to fire, thus holding the lay-in units firmly in place. This suspension system is the first to be combined with a lay-in ceiling unit to offer rated fire

protection. Both the lay-in unit and the grid system carry the U.L. label.

The Fire Guard lay-in ceiling system has been given a beam protection rating of three hours by the Underwriters' Laboratories, Inc. Floor-ceiling assemblies combining it with bar joist and slab, as well as with beam and steel floor construction, earned two-hour ratings. In areas which require more protection, Acoustical Fire Guard tile can be used. It has U.L. ratings of up to four hours.

**Costs Less than Ordinary
Fire-Protective Ceilings**

In many cases, the new lay-in ceiling will cost even less than ordinary plaster ceilings on metal lath. And like Acoustical Fire Guard tile, the new lay-in ceiling can save builders up to *two months'* construction time. There's no waiting for wet work to dry. This makes it ideal for remodeling jobs. Installation can be done during or after store hours.

In Popular Designs and Sizes

The Acoustical Fire Guard lay-in ceiling is now available in both the Classic and Fissured designs. There are two nominal sizes: 24" x 24" x 5/8" and 24" x 48" x 5/8".

For more information about either Acoustical Fire Guard tile or lay-in units, call your Armstrong Acoustical Contractor (he's in the Yellow Pages under "Acoustical Ceilings") or your nearest Armstrong District Office. Or write to Armstrong Cork Company, 4204 Ryman Street, Lancaster, Pennsylvania.

* Patent pending.

Armstrong ACOUSTICAL CEILINGS

First in fire-retardant acoustical ceilings

Architectural design and
rendering by Helmut Jacoby

**PRODUCTS,
EQUIPMENT,
MATERIALS**

hardening, epoxy insulating resin is poured into its shell by the electrician at the time the three-wire appliance cord is fastened to its terminals. This insulating resin fills all air spaces where inflammable gases or moisture might collect inside and hardens to form a water-tight, vapor-tight mass. Since the wires and terminals are embedded in the resin, connections cannot loosen to cause sparking. And since no water can reach the wires or terminals, the plug and cord may be washed safely when the plug is removed from the wall outlet. The receptacle is designed so that no current can flow through it unless the plug has been completely inserted and rotated 22°-25° clockwise. Thus there is no possibility of sparking between the contacts of the plug and the receptacle when the plug is being inserted or removed.

AIA FILE NO. 31-C-71

MFR: HARVEY HUBBELL, INC.

Circle 237 for further information

**ELECTRIC OPERATORS FOR
INTERRUPTER SWITCHGEAR**

MFR'S DESCRIPTION: electric operators have been introduced for mfr's line of high-voltage, metalclad fused load interrupter switchgear.

USES: industrial plants, commercial buildings, and institutions.

SPEC'S/FEATURES: electric operator uses a motor-operated worm-driven gearhead powered by control circuits of 12, 48, 125 or 250 v. dc, or 120 or 240 v. ac. It can be manually operated. An interlock switch prevents motor operation when the hand crank is engaged. The gearhead has 40-to-1 reduction ratio. It drives the high-voltage load interrupter through a chain-and-sprocket drive. Travel is controlled by limit switches. Positive motor control is provided by dynamic braking. Accessories available.

AIA FILE NO. 31-D-4

MFR: S&C ELECTRIC CO.

Circle 238 for further information

SURFACING

**WATERPROOF
WALL SURFACING**

MFR'S DESCRIPTION: panels of three-ply wall material have a visible outer surface of Micarta decorative laminate bonded to an inner core of moisture-resistant foamed polystyrene. Completing the 0.55-inch-thick sandwich, a Micarta backing sheet is bonded to the core for reinforcement.

USES: waterproof walls in tub-and-

Circle 140 for further information

PRODUCTS, EQUIPMENT, MATERIALS

shower enclosures.

SPECS/FEATURES: when installed the panels provide broad durable surfaces that are easily cleaned by wiping with a damp cloth. Abrupt corners at the two intersections of walls are eliminated by a $\frac{3}{4}$ -inch curvature pre-formed in each of two L-shaped end panels. The material is reported to be unaffected by water, is not cold to the touch, and will not chip, crack, craze, or fade in use. Available in marble patterns of four different colors and in two gold-

flecked solid colors.

AIA FILE NO. 29-H-3
MFR: MICARTA DIV., WESTINGHOUSE ELECTRIC CORP.

Circle 239 for further information
ANTI-SLIP

SURFACE FINISH

MFR'S DESCRIPTION: *Ruffin*, a new anti-slip surface finish is a brush-on or roll-on finish, based on *Thiokol* polysulfide modified epoxy on which fine or coarse abrasive grains are sprinkled.

USES: for floors, decks, ramps, docks,

elevated walk-ways and stair treads. **SPECS/FEATURES:** product adheres to wood, metal, cement and floor tile, to provide a durable, weather-resistant, anti-slip surface. It is recommended particularly for surfaces exposed to the weather, or those that are oily or slick.

AIA FILE NO. 24-B

MFR: CUSTOM ABRASIVE PRODUCTS CO.
Circle 240 for further information

COATINGS PRODUCE TILE-LIKE FINISH

MFR'S DESCRIPTION: *Farbo-Tile* coating systems, new epothane-base products with wide use applications, are now being manufactured.

USES: to provide a durable, tile-like finish to any interior or exterior surface.

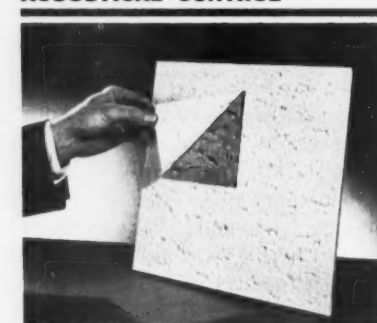
SPECS/FEATURES: the epothane base in the coatings forms a tenacious chemical bond with any surface, mfr states. Repairs, when necessary, can quickly and invisibly be made. Odorless and non-toxic, the coatings may be applied by brush, roller, or spray to glass, metal, concrete, composition or wood surfaces. They provide a tile-like finish at less than half the cost of installing ceramic tile. Coatings are washable, and are impervious to normal impact, abrasion or weathering. Available in 13 colors.

AIA FILE NO. 24-B

MFR: THE FARBOIL CO.

Circle 241 for further information

ACOUSTICAL CONTROL



PLASTIC FACED ACOUSTICAL TILE

MFR'S DESCRIPTION: a plastic faced acoustical ceiling material that combines natural fissuring with vinyl.

USES: areas which are subject to high standards of sanitation, such as hospitals, restaurants, food processing plants, and medical laboratories.

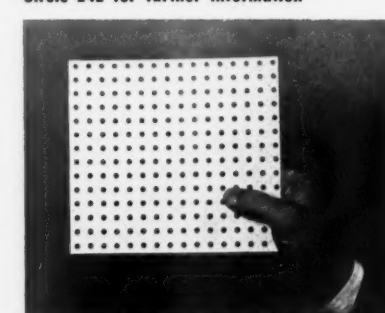
SPECS/FEATURES: unlike ordinary fissured mineral acoustical tile, *Vinyl Face Travertone* will withstand repeated washings and scrubbing, according to mfr. The thin vinyl film stretched over the face of the tile protects it from water damage, and also serves, through diaphragmatic action, to transmit

sound energy into the porous tile core where it is absorbed. A special manufacturing process insures that the vinyl facing will not shrink, crack or separate from the tile during service. The material is completely incombustible and can be installed either by mechanical suspension, or by cementing to any firm dry surface. Vinyl facing is pigmented pure white, but it can easily be repainted without affecting acoustical or maintenance qualities. Manufactured in 12" x 12" x $\frac{3}{4}$ " beveled edge tiles.

AIA FILE NO. 39-B

MFR: ARMSTRONG CORK CO.

Circle 242 for further information



ACOUSTICAL TILE FOR CORROSIVE ENVIRONMENTS

MFR'S DESCRIPTION: *Kemdot* is a natural, light but dimensionally-stable, translucent material, which will not rot, mildew, or corrode in high-humidity, chlorine-saturated pool atmospheres.

USES: sanatoriums, gymnasiums, steam rooms, exercise rooms, shower rooms, kitchens.

SPECS/FEATURES: product has high-impact resistance to withstand extreme abuse from water polo balls, rescue poles, etc. Panels are perforated with $\frac{3}{16}$ " holes, spaced on $\frac{1}{2}$ " centers in parallel rows, and are available in white and pastel colors. Matte finish reduces hot-spots and ceiling glare caused by highly-reflective water surface. Panels may be installed on a standard T-bar metal suspension system or screwed directly to treated wood suspension strips. Sound-absorbing pads or blankets may be laid on panels for greater noise control.

AIA FILE NO. 39-B

MFR: KEMTLITE CORP.

Circle 243 for further information

KITCHEN APPLIANCES

ELECTRONICALLY OPERATED DUCTLESS RANGE HOOD

MFR'S DESCRIPTION: *Airsweep* is the first electronically operated ductless range hood to completely remove smoke, cooking odors, bacteria and pollen from the air and, through the principle of electro-static ionization, to fortify the air with negative ions.

FOR YOUR

Doors of Distinction



Saint Louis

Sommerich & Wood—
Architects

United Lumber Co.—
Hardware Suppliers



Another instance of successful cooperation between architect, hardware consultant and Cipco in the design of distinctive entrance door hardware.



IPCO CORPORATION

2204 COLE STREET
ST. LOUIS 6, MO.

Circle 141 for further information

USES: kitchen applications.

SPECS/FEATURES: smoky, grease-laden air is drawn into the hood by blower action. As the individual microscopic air particles pass through the electronic ionizing chamber, they pick up an electrical charge which adheres to the collector plate containing oppositely charged filter plates. Pollen, dust, and odor particles of all sizes are removed in the process. The clean air is recirculated by a grille in the body which deflects the air toward the ceiling. Can be easily installed. Available in four finishes: coppertone, solid copper, solid stainless steel and platinum. Offered in sizes of 30", 36" and 42". Prices range from \$115 to \$150 depending on type of finish and size.

AIA FILE NO. 30-D-3

MFR: PROGRESS MANUFACTURING CO., INC.

Circle 244 for further information

BUILT-IN LINE OF RANGES AND OVENS

MFR'S DESCRIPTION: a completely new line of built-in gas or electric ranges and ovens is announced.

USES: kitchen applications.

SPECS/FEATURES: featured in the line is a 24" built-in gas double wall oven, reported the only one of its kind on the market. This model offers infrared broiling, roasting or barbecuing in the top oven. Also featured is a 24" electric double oven, with the top oven fully automatic and clock-controlled. A built-in counter-level oven and range, the *Diana 24*, is also being offered in either gas or electric. These ranges are designed to fit the space normally taken by a 24" base cabinet and are fully automatic and clock-controlled. All models of the built-in ovens and ranges are available in brushed chrome or copper-tone, or pink, yellow and turquoise porcelain.

AIA FILE NO. 35-C-11

MFR: YOUNGSTOWN KITCHENS DIV., AMERICAN-STANDARD

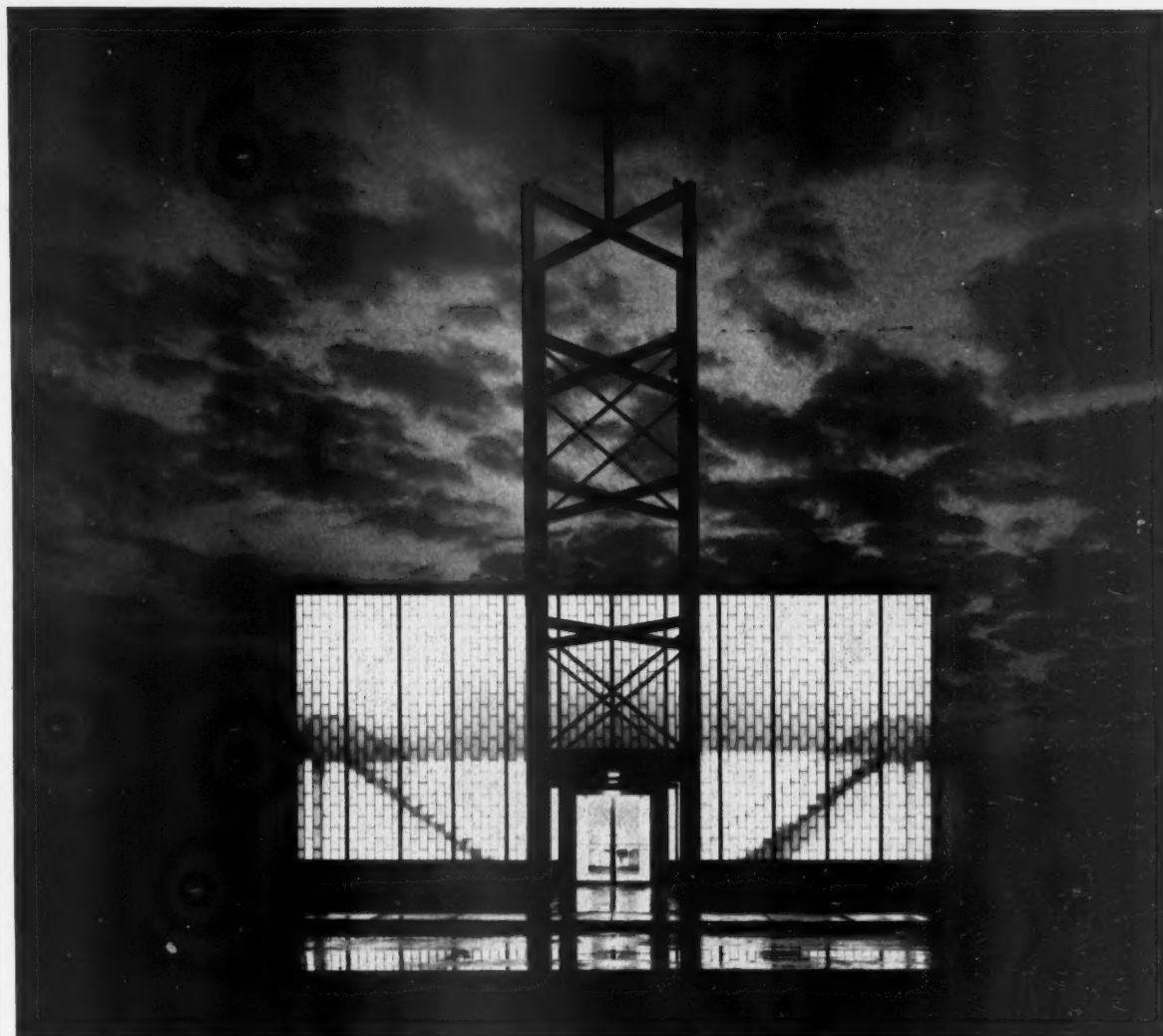
Circle 245 for further information

ALUMINUM USES

ALUMINUM SOFFIT AND FASCIA SYSTEM

MFR'S DESCRIPTION: a complete aluminum soffit and fascia system designed to banish the problem of moisture collection under roof overhangs. USES: with any style of roofing design. System may be interlocked with mfr's siding and gutter and downspouts.

SPECS/FEATURES: the new system includes five variations of soffit sheet, four fascia designs, and a complete line of accessory items. The soffit pieces are available perforated, or



Built with translucent Kalwall: First Missionary Church, Berne, Indiana. Architect: Orus O. Eash, A.I.A.; Contractor: Habegger Construction Co.

To help you do bold new things with light ...Kalwall translucent walls

In creative hands, light is "a many-splendored thing."

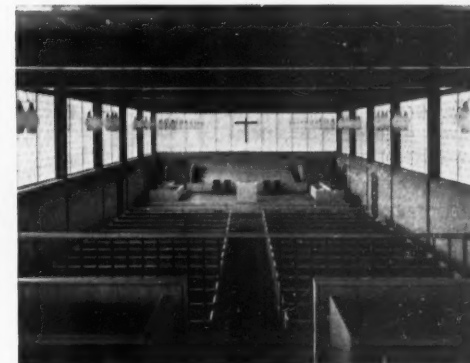
And with translucent Kalwall you can translate this "many-splendored thing" into design, most imaginatively and dramatically.

You get softly diffused light with Kalwall Translucent Walls — light that's shadowless and pleasantly glare-free.

You also get great structural strength. For lightweight as Kalwall is (1.5 lbs/sq ft), it is so strong that no intermediate support is required. Shatterproof. Weather-tight. Available in panels up to 4' x 20', white or colored — with a choice of modern, functional patterns produced by aluminum grid cores. Write for details on this new way to "build with light."

KALWALL CORPORATION

DEPT. C-41, 43 UNION STREET, MANCHESTER, N. H.



Kalwall lights church interior evenly — no "hot spots."

Circle 142 for further information

PRODUCTS, EQUIPMENT, MATERIALS

non-perforated, in widths of 24 and 36 inches, and are pre-painted in white *Alumalure*, mfr's special baked enamel finish. The soffit features a stucco pattern for a soft, glare-resistant surface, and is ribbed for maximum strength between rafters. Perforations are $\frac{1}{8}$ -inch in diameter and are on 21/64-inch staggered centers. The perforated soffit sheet contains 14 per cent open area.

AIA FILE NO. 12-P

MFR: ALCOA BUILDING PRODUCTS, INC.

Circle 246 for further information

UNIVERSAL TYPE ALUMINUM SOLDER

MFR'S DESCRIPTION: an aluminum fluxless solder that melts at ordinary soldering temperatures.

USES: for joining any metals except black cast iron.

SPECS/FEATURES: Tin-A-Lum can be used with almost any type of heat except a flame of a sooty nature. No fluxes or soldering fluids are necessary permitting its easy use with a soldering iron. Mfr claims good machineability. The finish obtained is much the same as the parent metal. Recommended for use in the prefabrication of gutters and downspouts.

AIA FILE NO. 12-A-5

MFR: METALS FOR INDUSTRY INC.

Circle 247 for further information

SNOW GUARDS FOR CORRUGATED ROOFS

MFR'S DESCRIPTION: *Filtrite 400* series of snow guards.

USES: corrugated metal or asbestos cement roofs.

SPECS/FEATURES: series features a $\frac{1}{4}$ " thick cast aluminum alloy base plate $7\frac{1}{2}$ " x $7\frac{1}{2}$ " which is bolted across three corrugations on $5\frac{1}{4}$ " centers. *Filtrite* snow guard #431X takes three galvanized pipes and is designed for maximum protection on large roofs. For roofs 18' and under, *Filtrite Jr.* #421X, two-pipe snow guard is recommended.

AIA FILE NO. 12-F

MFR: DAVID LEVOW, INC.

Circle 248 for further information

PAINTED ALUMINUM FOR DECORATIVE TRIM

MFR'S DESCRIPTION: *Reflective Color-weld* is an aluminum trim reported to retain most of the metal's reflective luster.

USES: decorative applications, wall paneling, etc.

SPECS/FEATURES: mfr claims that



New Pan American World Airways Passenger Terminal, New York International Airport.

Circle 143 for further information

Architects and Engineers: Tippetts-Abbett-McCarthy-Stratton, New York.

Associated Architects: Ives, Turano and Gardner.

General Contractor: Turner Construction Company.

SARALOY® 400

frees design from conventional flashing limitations,
cuts flashing labor costs 25% for new air terminal

45,000 square feet of Saraloy 400 roof flashing provide hundreds of *permanent* moisture seals for this ultra-modern air terminal. Among the many critical flashing problems solved by Saraloy 400 were: sealing 875 acute and obtuse angles created by almost inaccessible junctures of structural steel beams and purlins; flashing steel-to-concrete joints and lining scupper holes.

The design of the terminal's elliptical cantilevered roof produced 144 different odd shapes and angles where beams, purlins and equipment housing shells meet. Flashing with conventional materials would require that each seal be specially cut and custom-fitted, often to match curved contours. The labor costs for installing metal flashing would have been prohibitive. Because Saraloy 400 could be quickly and easily cut and formed on the job, labor costs were about 25% less than the cost of installing conventional flashing materials. And each seal is permanent.

Saraloy 400 is Dow's brand of flexible roof flashing. It can be bonded to almost any construction material, such as concrete, wood, metal, ceramic, and it can be painted. It provides a permanent watertight seal which won't check, peel or crack . . . and which moves with building contraction and expansion. For more information write to THE DOW CHEMICAL COMPANY, Midland, Michigan, Plastics Sales Dept. 1501JF4.



Saraloy accomplishes difficult flashing
of bolted girder-purlin intersection

OTHER DOW BUILDING PRODUCTS

STYROFOAM*—Long-lasting insulation for cavity walls; effective insulating base for plaster and wallboard. Rigid, low "K" factor, highly resistant to water and water vapor.

SCORBORD* (pat. applied for)—Superior rigid insulation for foundation perimeters, slab floors. Exclusive pre-scoring speeds installation.

ROOFMATE*—Lightweight, rigid insulation for built-up roofs serves as its own moisture barrier. Reduces blistering, resultant leaks. 2' x 4' boards speed installation. *TRADEMARK

PRODUCTS, EQUIPMENT, MATERIALS

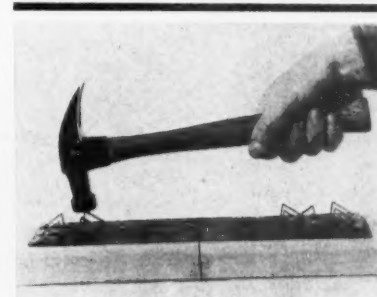
paint-application technique gives product a mirror-like quality superior to color anodizing on bright sheet, and equal to color anodizing on all other surfaces with less danger of damaging the surfaces. Available in widths of one to 18 inches, 10 colors, and three finishes—one side bright, embossed and brushed. One side bright and embossed sheet is available in a minimum gauge of .012 inches, and brushed sheet is available in a minimum of .020 inches.

AIA FILE NO. 15-J

MFR: REYNOLDS METALS CO.

Circle 249 for further information

ROOF TRUSS CONSTRUCTION



SELF-NAILING TRUSS CLIP

MFR'S DESCRIPTION: self-nailing, metal truss clip which permits the manufacture of roof trusses in plants or on the site without expensive, heavy presses or rollers.

USES: roof truss construction.

SPECS/FEATURES: *Truss Clip* is reported to result in cost savings in truss fastenings of up to 50 per cent when compared to plywood gussets and nails. It is made of zinc coated steel in only four sizes to handle most trusses used on homes today. Nails can be driven with one blow of a regular carpenter's hammer or several at a time with a stake. FHA accepted designs are furnished.

AIA FILE NO. 27-A

MFR: THE PANEL-CLIP CO.

Circle 250 for further information

CONCRETE PRESS FOR TRUSSES AND PANELS

MFR'S DESCRIPTION: a concrete press for the fabrication of roof trusses and stud wall panels.

USES: field site fabrication.

SPECS/FEATURES: the press is forty feet long between the guide posts, and eight feet wide. The pressing section or platen, weighs 100 tons

THE DOW CHEMICAL COMPANY

DOW

Midland, Michigan

Circle 143 for further information



Specify cement-base weatherproofing!

THOROSEAL

keeps water out, stops masonry erosion

Treat your masonry and concrete structures right from the start. Don't paint. Use cementitious Thoroseal — it lets walls "breathe" so damaging water vapors can't accumulate as they do behind thin paint film. No worry about flaking, blistering, peeling. Thoroseal bonds compatibly with all masonry or concrete.

As you see in the cross-section above, Thoroseal penetrates deeply, seals every pore. It actually becomes part of the wall it's brushed onto — and lasts just as long! Add this vital protection to all your structures in masonry or concrete, above grade or below.

Thoroseal keeps your designs clean-lined, erosion-proof, watertight. Job-tested since 1912.



And solve even high-pressure water problems with Waterplug. A perfect hydraulic cement. Stops active running water — instantly. Plugs troublesome wall-to-floor joints, seals masonry faults, blocks all leaks.

- Write for free specification guide on the 21 products of The Thoro System for waterproofing and decorating all types of masonry and concrete.

STANDARD DRY WALL PRODUCTS, INC.
DEPT. A-2, NEW EAGLE, PENNA.

Circle 144 for further information

70

PRODUCTS, EQUIPMENT, MATERIALS

and will press all the *Gang-Nail* connector plates in a truss up to forty feet in length in one pressing, in less than ten seconds. The platen is raised by two hydraulic jacks, one at each end, and powered by a five HP motor and pump. One pressman controls the press for two three-man crews. Trusses are put into the press alternately from each side, or one crew may be making stud wall panels or interior partitions from one side, while the other crew is making trusses from the other side.

AIA FILE NO. 4-D

MFR: GANG-NAIL SALES CORP.

Circle 251 for further information



LEAD REFILLS FOR FILM TRACING PENCIL

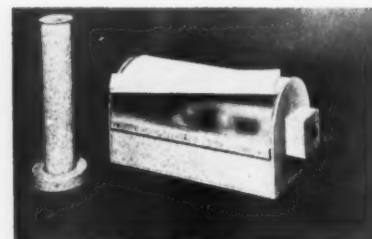
MFR'S DESCRIPTION: lead refill units. USES: with mfr's *FTR* (film tracing reproduction) holders for tracings on polyester-based film.

SPECS/FEATURES: the *FTR* units are packaged in a transparent plastic tube with a hang-up cap. Refills are manufactured in six degrees of density, ranging from *FTR* 11 to *FTR* 66. The degree designation is clearly marked on each refill container.

AIA FILE NO. 35-H-3

MFR: THE JOSEPH DIXON CRUCIBLE CO.

Circle 252 for further information



LOW-COST OFFICE COPYING MACHINES

MFR'S DESCRIPTION: two portable, low-cost copying machines are offered.

USES: drafting rooms and general office use.

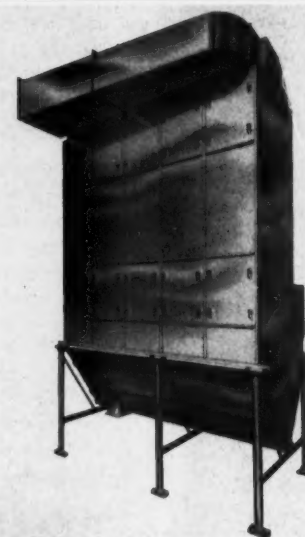
SPECS/FEATURES: machines produce copies with blue line on white background. Sketches, line drawings and printed material can be reproduced with clarity. A small model, the *Commodore*, reproduces copies up to 10" x 13" and lists for \$30. A larger model, the *Ambassador*, can copy material up to 18" x 24" and lists for \$60. Each model consists of two parts. An exposure unit, with an automatic timer, produces copy in about 45 seconds. A developing chamber develops clear, permanent copies of material on any ammonia-sensitive paper. No special maintenance is required by either model. Machines will make copies for approximately one to 4¢ apiece (depending upon sheet size).

AIA FILE NO. 35-H-31

MFR: JIMCO

Circle 253 for further information

MISCELLANY



AUTOMATIC DUST COLLECTION UNITS

MFR'S DESCRIPTION: a line of automatic dust collectors, with self-cleaning action and modular design, has been introduced.

USES: industrial applications.

SPECS/FEATURES: constructed of 3/16" polished aluminum, the units clean in three ways: (1) periodic shaking of cloth filter tubes combined with reverse airflow through the filters; (2) continuous removal of collected material by an adjustable screw conveyor at the base; and (3) discharge of collected material through a rotary feed valve. The modular sections of the units permit adaptation to varied dust collection and space requirements. Eleven models of the

units are offered, ranging in size from 2 to 12 in the number of sections they incorporate. Each model is 5' deep and 15'-6" high. They vary in width from 4'-8" to 21'-10", depending on the number of sections employed in one bank. The units are shipped KD for assembly on the job site.

AIA FILE NO. 35-J-1

MFR: TORIT MANUFACTURING CO.

Circle 254 for further information

CONTACT CEMENT IN AEROSOL CONTAINER

MFR'S DESCRIPTION: *Spray-A-Bond* contact cement is now offered in an aerosol container.

USES: for bonding wood, metals, leather, paper, glass, ceramics and many other materials.

SPECS/FEATURES: aerosol packaging eliminates the need for paint brushes, rollers, spreaders and any messy clean-up. Product offers ease of application, high initial bond strength, high resistance to heat, and minimum of odor. In addition to packaging in 16 oz. aerosol containers, product is also available in 3 oz. bottles, pints, quarts, gallons, 5 gals. and 55 gal. drums.

AIA FILE NO. 3-A

MFR: BESTWOOD CORP.

Circle 255 for further information



INSULATING PLASTIC FOAMS

MFR'S DESCRIPTION: two developments in insulating plastic foam have been announced—*Thurane* and blue *Styrofoam*.

USES: refrigeration appliances, pipe and refrigerator truck insulation, roof insulation, and sandwich and low temperature space insulation.

SPECS/FEATURES: *Thurane*—rigid urethane foam boards with high solvent resistance and heat distortion and low thermal conductivity. (The permanent "K" factor is .16 to .17



COLLEGE LIBRARY—NEW YORK, N. Y.

O'Connor and Kilham—Architects

Robert Glenn Inc.—Builders

Ceramic Veneer in oyster white glaze was specified for through-wall grilles on east elevation 28' x 170' with a 34' return on the north and south elevations; facing for columns is Ceramic Veneer in a dark, mottled green.

No need to curtail creativity when you specify Ceramic Veneer

The unrivaled versatility of Ceramic Veneer aids you greatly in solving unusual design problems. Every unit, large or small, for interiors or exteriors, is custom-made to your precise specifications. You can specify sculpture, polychrome panels, plain surfaces or one of the many smart new Federal Seaboard grille designs. And no other time-tested building material offers such a vast selection of colors and textures. Ceramic Veneer can be combined readily for harmony or contrast with all other materials. For new buildings or for modernization, investigate the advantages of Ceramic Veneer—from design-ability to desirability, from initial cost to ease of maintenance. Write today for new solar screen and color guide brochures. Without charge we will gladly furnish construction detail, data, advice and estimates on preliminary sketches involving Ceramic Veneer.

FEDERAL SEABOARD TERRA COTTA CORPORATION



10 E. 40th St., New York 18, N.Y.

Plant at Perth Amboy, New Jersey



Circle 145 for further information

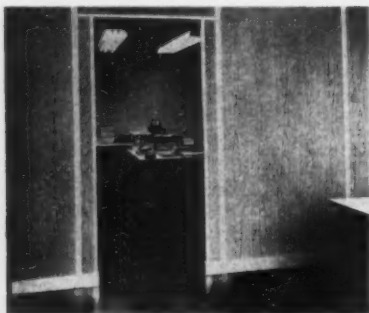
PRODUCTS, EQUIPMENT, MATERIALS

at 70° F.) It is priced approximately 20 per cent higher than *Styrofoam* on an equivalent insulation basis and 90 per cent higher on equal thickness. A blue *Styrofoam* brand insulation board with flame-retardant properties is designed to replace other forms of *Styrofoam* in major construction applications. Mfr says the product will be competitively priced. It will replace *Styrofoam 33* and 22. Mfr also announces the development of a third foam, *Tyrl-foam*, for flotation use where resistance to gasoline is desirable.

AIA FILE NO. 37-D

MFR: THE DOW CHEMICAL CO.

Circle 256 for further information



HIGH PRESSURE DECORATIVE LAMINATE

MFR'S DESCRIPTION: *Railite* veneer is a thin, flexible laminate for facing surfaces to create appearance of wood.

USES: surfacing movable partitions and walls.

SPECS/FEATURES: product is a high pressure decorative melamine laminate available in many simulated woodgrains and solid colors. Surface is resistant to staining, abrasion, scratches, and is cigarette proof, according to mfr. It can be cleaned with a damp cloth. It can be easily cut and applied with contact adhesive to almost any type of base material, mfr states.

AIA FILE NO. 23-D

MFR: REISS ASSOCIATES, INC.

Circle 257 for further information

HEAVY TRAFFIC FLOOR TILES

MFR'S DESCRIPTION: the availability of *Vina-Lux Premiere* series in 1/8" and 3/32" gauges has been announced.

USES: flooring for heavy traffic areas where high styling is desired and serviceability is a necessity.

SPECS/FEATURES: *Premiere* has a fleecy-cloud pattern which extends

Circle 146 for further information →



Day-Brite PARAFLO® Troffers with patented PARALOUVERS® simplify ceiling appearance and planning by eliminating the need for separate air diffusers . . . deliver 100 footcandles with a minimum of glare. PARAFLO Patent Nos. 2,845,854 · 2,845,855 · 572,565 · 575,897
PARALOUVER Patent Nos. 26,833,799 · 507,541

Sleek fixture appearance complements modern wall treatment throughout building.

Pure Oil Company Building, Palatine, Illinois
Architect: *Perkins & Wills*; Electrical Contractor: *Kelso Burnett Co.*



Who goofed and forgot the air diffusers?

Nobody goofed.

In fact, very *special* attention was given to assure Pure Oil Co. employees the finest in year 'round comfort. Day-Brite combination lighting-air diffusing fixtures deliver lighting, cooling, heating and ventilation — all through the same outlet.

The result is an attractive, efficient working environment with...

High-level, low-glare Day-Brite lighting for better vision;

More uniform air distribution, thanks to the many diffusing sources;

And clean, uncluttered ceiling appearance.

A full year was spent pre-testing these

Day-Brite fixtures from every possible angle, including ease of installation and maintenance. Now in operation, Pure Oil Co. engineers report "complete satisfaction!"

For more information on how Day-Brite combination lighting-air diffusing fixtures can simplify your next ceiling plan, contact your Day-Brite representative listed in the Yellow Pages or write *Day-Brite Lighting, Inc.*, 6260 N. Broadway, St. Louis, Mo., and Santa Clara, Calif. In Canada: *Amalgamated Electric Corp., Ltd.*, Toronto 6, Ont.

Write for FREE booklet on **Comfort Conditioning with Light and Air:**
Day-Brite Lighting, Inc., 6260 N. Broadway, St. Louis 15, Mo.



NATION'S LARGEST MANUFACTURER OF COMMERCIAL AND INDUSTRIAL LIGHTING EQUIPMENT

PRODUCTS, EQUIPMENT, MATERIALS

through the full thickness of the tile, giving a permanent styling which cannot wear away. Available in seven pastel colors, including two metallics, in 9" x 9" size. It is available at regular vinyl asbestos tile prices, with the metallics priced slightly higher.

AIA FILE NO. 23-G

MFR: AZROCK PRODUCTS DIV., UVALDE ROCK ASPHALT CO.

Circle 258 for further information



VIBRATION ISOLATION PAD

MFR'S DESCRIPTION: *Kinetic* vibration isolation pad is announced as an efficient product using specially processed, high density fiberglass.

USES: with machinery to isolate vibration and eliminate noise of vibration.

SPECS/FEATURES: pads are furnished in 18" x 18" x 1/2" sheets which are prescored at 2" intervals for easy cutting-to-size on the job. Guaranteed not to "creep," product permits mobile rather than permanently installed production machinery. By elimination of lag screws and special foundations, up to 90 per cent savings in installation or relocation of machinery is obtained, mfr states.

AIA FILE NO. 39-D

MFR: CONSOLIDATED KINETICS CORP.
Circle 259 for further information

INSULATION MASTIC

MFR'S DESCRIPTION: *Vaporbond* is a mastic designed to bond board insulation to masonry walls and ceilings.

USES: low temperature installations. SPECS/FEATURES: the mastic is composed of carefully selected raw materials, which are free of food contaminating odors, states mfr. Every batch is tested under rigid quality control standards. *Vaporbond* has excellent adhesion to clean dry concrete, corkboard, foamglas, steel, wood, and expanded polystyrene. Replaces #330 *Enamelite*.

AIA FILE NO. 37-D-1

MFR: PRESSTITE DIV., AMERICAN-MARIETTA

Circle 260 for further information

← Circle 146 for further information

COMPREHENSIVE PLAN FOR THE CITY OF PHILADELPHIA

RICHARDSON DILWORTH
CITY PLANNING COMMISSIONG. Holmes Perkins, chairman
Edmund N. Bacon, executive directorW. V. von Moltke, chief designer
REDEVELOPMENT AUTHORITYMichael von Moschzisker, chairman
William L. Rafsky, directorproject
mayor
planning

redevelopment



1800



1900



1960

URBAN GROWTH IN PHILADELPHIA 1800-1960 (Maps: courtesy of Philadelphia City Planning Commission).

General background

Replanning of Philadelphia began effectively in 1942 with creation, by ordinance, of a City Planning Commission, with Robert B. Mitchell as its first executive director. Impetus had come from various private groups, 60 of which together petitioned the Philadelphia City Council for establishment of a planning program. These organizations subsequently became a formal Citizens' Council on City Planning, which has grown to include over 200 members. Considerable results in terms of citizens' education were achieved by the Better Philadelphia Exhibition, a plan for a vast complex of public and commercial buildings, held in 1947. Passage by Congress of the 1949 National Housing Act made available billions of dollars for reconstruction of American cities. In 1952 a reform administration was elected under Mayor (now U. S. Senator) Joseph Clark, and a Home Rule Charter was adopted, which assigned to the City Planning Commission the following basic functions:

- Preparation, adoption, and modification of a comprehensive plan of the City to be known as the Physical Development Plan.

- Annual preparation of a capital program for the ensuing six-year period, and a capital budget for the ensuing year for consideration by the Mayor and the Council.

- Recommendations to the Council on all bills affecting any zoning ordinance, the Physical Development Plan, streets and subdivisions, the capital program, and the acquisition or sale of City real estate.

- Approval or disapproval of plans of streets and revisions of such plans, and land subdivision plans.

- Preparation of regulations governing the subdivision

- of land.

- Preparation of proposed zoning ordinances.

A second factor in the rebuilding of Philadelphia is the Redevelopment Authority, created as a public agency under State law in 1945 and operating with City, State and Federal funds. It is related to the City Planning Commission in the following manner: the Planning Commission certifies redevelopment areas, makes area redevelopment plans and reviews detailed urban renewal proposals; the Authority then sets up a program complying with legal requirements and in keeping with the Planning Commission's area plan; it then submits the program to the City Council and Federal agency for approval. Approval empowers the Authority to acquire properties in that area by condemnation, gift or voluntary purchase. Residents and businesses are relocated where demolition is to take place. Structures are demolished, others rehabilitated by owners or builders, and the cleared land is prepared for disposition to redevelopers. Redevelopers are bound by contract to complete development in accordance with the plan. Restrictions are imposed to prevent deterioration.

Major programs completed or under way

- Penn Center, for which the first building was begun in 1954, became a key project in the struggle to inspire investors' confidence. Land owned by the Pennsylvania Railroad west of City Hall was made available for redevelopment, and successful efforts were made by City Council and Planning Commission to dissuade the Railroad from sanctioning development piecemeal. Chief elements of Penn Center are office buildings, a hotel, an apartment tower, a shopping concourse and an information center.

- Independence Mall Project, involving an expenditure of \$26 million.

- The functions of Dock Street Market were replaced by a new Food Distribution Center.

- Extensive public and private housing.

- Large scale city expressway construction.

- Torresdale water purification plant, built at a cost of \$25 million.

The Comprehensive Plan

The Comprehensive Plan for Philadelphia was issued in 1960 after nine years of study by the City Planning Commission, and will control the form of the city for the next 20 years. Cost of the proposals is expected to be \$3.5 billion, of which the City's share will be \$921 million. The balance is to be shared in equal parts by the State and Federal governments on the one hand, and by the Board of Public Education and self-supporting projects on the other.

Population and residence

The Plan predicts a 1980 population of 2¼ million inhabitants, an increase of one quarter million from the 1960 census figure. Residential land use will constitute 41,000 acres, which is 48 per cent of the total. Proportion of apartment dwelling units is expected to rise by 6 per cent from today's 22 per cent, and proportion of row houses will decline from 57 per cent to 48, primarily through razing of blighted areas. Net residential density will be reduced from 29 families per acre (1950 census) to 25.

Neighborhood organization

In order to provide appropriate levels of service, the City is to be divided into ten Districts of 150,000 to 300,000 people. These have been further divided into 56 Communities having from 25,000 to 50,000 people apiece.

Each Community will comprise Neighborhoods of about 5,000 to 15,000 residents.

Recreation and community facilities

The Recreation Section of the Plan calls for one playground per 11,000 inhabitants; thus each Neighborhood may be expected to have a playground, which could also be a focal point for the area. The present ratio of 10,600 persons per elementary school closely approximates playground standards.

The Plan also relates libraries to different population level areas: branch libraries are to be located in Communities and regional libraries in Districts. The Plan accordingly proposes 41 Community libraries (13 are still to be built), and six District libraries (all to be built). Community facilities will be established as follows: playfields at the rate of one per five or six playgrounds, to a total of 40; 20 district parks, in addition to local parks located in Neighborhoods; and two new regional parks, in addition to six existing ones maintained as natural areas. Total park acreage, apart from local parks, calls for 10,000 acres by 1980, compared with 7,000 acres today. Eight District community centers will supplement the two at Center City Germantown; and 56 community centers at Community level will be built containing libraries, health clinics and recreation facilities. These Centers call for a location close to major shopping centers and transportation. In addition, ten health centers—of which seven now exist—are indicated to serve about 250,000 people each, and to complement satellite clinics located in schools and community centers.

Land use

Over 3,000 acres presently in residential use will be redeveloped for other uses, chiefly industrial and commercial. On the other hand more than 1,000 acres will be converted from non-residential to residential. Most land for which rezoning is proposed is in the "blighted" category. By 1980, 8,000 acres of land vacant in 1950 will have been added to the 1,000 converted acres for the purpose of housing. In addition, "major" reconstruction (33 per cent or more of dwelling units) is proposed for 5½ square miles of residential areas, and "limited" (10 to 33 per cent) for another 15 square miles. This new housing is expected to absorb 350,000 persons displaced because of redevelopment.

Industry

Trends towards one floor plans, more generous provision for parking, loading and landscaping, as well as the rise of automation have brought a great deal of pressure on industry to seek new locations outside the city. As a remedy, the Plan for Industry proposes:

- 1 Clear definition of zones that are to remain industrial.
- 2 Reservation for industrial use of areas presently vacant.

3 Redevelopment for industrial use of land presently used in other ways.

By 1980 18,000 acres are scheduled to be devoted to industrial use compared with 12,500 net acres today. This figure includes major utility installations, harbor, airport and rail terminal facilities. Total land use in Philadelphia is about 83,000 acres. The Plan relates the location requirements of industry to their type and to their need for access to labor force, supplies, markets and transportation. The City has been divided into five industrial zones:

location	principal activity
1 Center City	Manufacturing and wholesaling.
2 Inner Zone	Related to Center City; also City's service industries.
3 Outer Zone	Varied industries
4 Waterfront	Industries requiring extensive land, rail and water access and cooling water.
5 Far Northeast	Industrial "parks."

Commerce

The Plan for Commerce is based on the concept of different levels of service related to the pattern of Districts, Communities and Neighborhoods. For example, an intermediate shopping center would be part of a Community. Key to the plan is replacement of scattered or strip commercial land uses by conveniently located commercial centers, whose size will determine the variety of goods offered. Commercial land use will remain at 4,000 acres, or about 5 per cent, but will entail greater concentration. Four types of commercial areas are envisaged:

A fifth category, known as a free standing commercial area, is designed for self-sufficient businesses which do not depend on customers of other stores. Auto showrooms, appliance dealers and motels belong to this category. Since they cater chiefly to customers arriving by car, they are in their existing form and sites a major source of traffic congestion, particularly as they do not usually provide adequate parking. The Plan proposes relocating some of these activities to the peripheries of regional and intermediate centers, or of industrial locations; or to special clusters on certain arterial streets. To relieve the parking problem, off street parking will be required as well as frontage roads to offset conflicts with traffic flow.

Transportation

The Plan distinguishes three categories of road transportation: *expressways*, which connect major activity centers of Philadelphia with the surrounding region; *arterial streets*, which serve the expressway system and

act as a link between areas of differing land uses; and *local streets*.

At present, there are 2,400 miles of roads within the City's boundaries. Local and arterial streets pre-date the Second World War for the most part and are inadequate for today's traffic needs. The 12 miles of new expressway are heavily overloaded. Apart from highways, there are 24 miles of subway and 58 miles of commuter rail lines, used each day by most of those traveling to and from Center City. To remedy inadequacies of the present system, a combination of measures has been called for, as follows:

- 1 Construction of 83 additional miles of radial and circumferential expressways.
- 2 Construction of ten additional miles of subway and the reconstruction of eight existing miles.
- 3 Reconstruction of large sections of the proposed 500 mile arterial street system.
- 4 Connection of the major existing commuter rail line facilities by construction of a downtown loop linking the Pennsylvania and Reading Railroads.
- 5 Automobile parking facilities designed to meet growing parking demands particularly in Center City, commercial centers, industrial areas and transfer points between highways and transit facilities.
- 6 Improvement of rail and port facilities to meet growing requirements for long-distance heavy goods movement.
- 7 Airport improvements to meet increased air travel demands including helicopter travel.

Center City is to be served mainly by rapid transit and commuter rail line. For areas within 5 miles of Center City, bus and trolley lines will predominate. Outlying areas call for private car transportation. A large proportion of travel is expected to be between zones, involving transfers from one facility to another, with the resulting need for parking.

A master development plan for the International Airport has been included in the Comprehensive Plan. A

QUANTITY	TYPE	PEOPLE SERVED	MAXIMUM TRAVEL TIME	PRINCIPAL STORES AND FUNCTION
5	regional	125,000 and up	25 minutes	Mostly department stores.
21 (3 new)	intermediate	40-120,000	15 minutes	Junior department stores, weekly shopping necessities, specialized local services. 17 already in existence require modernization, 1 is already adequate.
169	local	5-20,000	5 minutes	Supermarket major tenant. Serves daily and weekly shopping needs.
1	convenience center			5 mile radius around City Hall (Center City) Food stores primarily. No parking required.



INDUSTRIAL ZONES (Map: courtesy of Philadelphia City Planning Commission.)



THE COMMERCIAL LAND USE PLAN (Map: courtesy of Philadelphia City Planning Commission.)



EXPRESSWAY AND ARTERIAL SYSTEM (Map: courtesy of Philadelphia City Planning Commission.)

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passenger load of 6 to 10 million persons a year is being taken as a design criterion for additions to or modifications of hangars, runways and terminal space. By comparison, two million passengers were accommodated in 1959. Heliports are proposed for the two city airports and for additional strategic locations.

A Port improvement program is already under way, embodying modernization, construction of new berthing facilities and removal of derelict piers. This program will be continued.

Costs

It would take the City 37 years to complete the Plan at its present \$25 million annual rate of expenditure for tax-supported projects. The city's share of total costs is \$921 million. However, personal income has been calculated to rise by 51 per cent by 1980, so that the Plan may be accomplished in 28 years if the ratio of capital expenditure to gross City income remains constant. For the difference between 28 years and the 20 year completion date, the City is banking on \$9 billion of private investment stimulated by the Plan.

Strategy and coordination

The Plan recognizes priority of some of its aspects over others. Success of the Industrial section of the Plan assumes that many of the transportation proposals will have been carried out or will be proceeding concurrently. Similarly the City's economic condition cannot improve at the expense of a deteriorating residential environment. This infers a high priority for housing in the context of urban renewal. Related to residential requirements is the matter of recreation. Impending pressures on development of all currently available open land will put a high priority on advance acquisition of land designed for this purpose.

The Comprehensive Plan and Center City

Center City is the name given to that part of the city which usually comes to mind when we think of Philadelphia: the historical hub bordered east and west by the Schuylkill and Delaware rivers, with the Art Museum to the northwest and South Street to the south. It includes the four squares laid out by William Penn, towering City Hall at the intersection of Broad and Market Streets, and the historic structures of Independence Hall, the First and Second National Banks of the United States, Carpenters' Hall and the Merchants' Exchange. Center City is the site of 25 per cent of the region's employment, of the region's major cultural and entertainment places, and of its dominant retail concentration.

The Core

An area of 320 acres constitutes the high intensity business center of Center City. It is composed of two nuclei: office concentration south of City Hall on Broad Street, and a department store concentration at 8th and Market Streets. The Plan will connect them by means of a major development along East Market Street to be known as "Market East" described in greater detail below. Circulation within the Core is based a) on pedestrian—automobile traffic separation along Market Street and b) on a special trolley-line along Chestnut Street, which runs east and west.

Transportation and parking

The Plan calls for three major transportation proposals aimed at delivering people to Center City in an efficient manner:

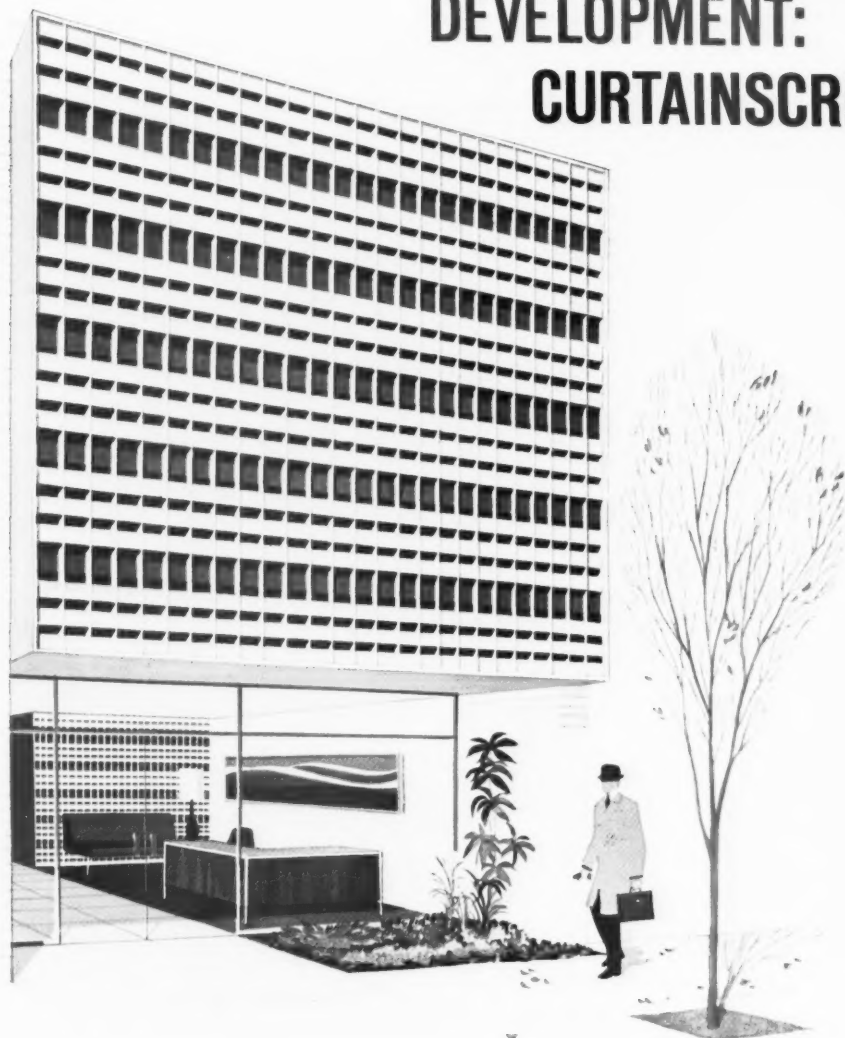
1 The Expressway Loop, designed, first, to provide a bypass for non-Center City bound traffic, and second,

(Continued on page 79)

Circle 147 for further information about JULIUS BLUM →

Architectural & Engineering News

NEW DESIGN DEVELOPMENT: CURTAINSCREEN*



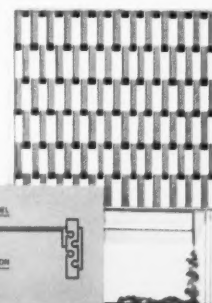
NOW YOU CAN CUSTOM-DESIGN FACING SCREENS, SOLAR SCREENS, OR ANY KIND OF SCREEN, INSIDE OR OUTSIDE

Meet Julius Blum's **Curtainscreen**, the versatile screen system that forms exterior or interior screens of any kind, any size, any scale, anywhere! Now, with **Curtainscreen**, architects and decorators can design **custom** screens with **standard components**, used either alone or in combination with other materials. And because of **Curtainscreen's** versatility, it can provide design continuity throughout a building. Here, for example, a remodeled building employs an exterior facing screen design which is echoed exactly, **but in smaller scale**, in an interior partition. Another design approach is indicated at right.

The highly flexible **Curtainscreen** system consists of aluminum and plastic components — mullions, panels, glazing stops, and spacers — and it can accommodate a wide range of other materials. Components are available in a variety of finishes: anodized,

plain (for anodizing or enameling), etched with decorative designs, or laminated with wood veneers. Plastic components are available in black or in colors. The potential combinations of colors, sizes, shapes, textures and materials are myriad, and so are the potential applications. What's more, **Curtainscreen** is engineered to permit **design continuity** throughout a building, wherever it is used. If you'd like a more complete introduction to components, features, details, applications, and design possibilities, write for the new **Curtainscreen Bulletin**.

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Variation and
Construction
Detail



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When it comes to "clothing" her home
or her person,

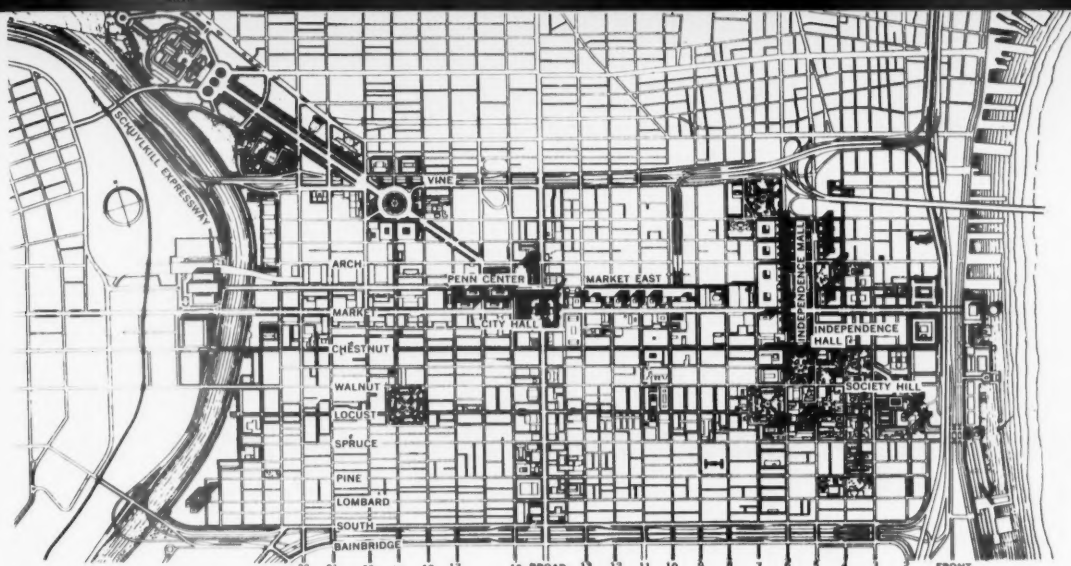
**she prefers the real
—the genuine!**

Her good taste and fashionable appearance
are reflected in the authentic—genuine
furs . . . genuine wood siding. She looks to
you with confidence for professional guidance
in planning and styling her home. The lady,
like so many discerning clients, will want
the ultimate in home exteriors.

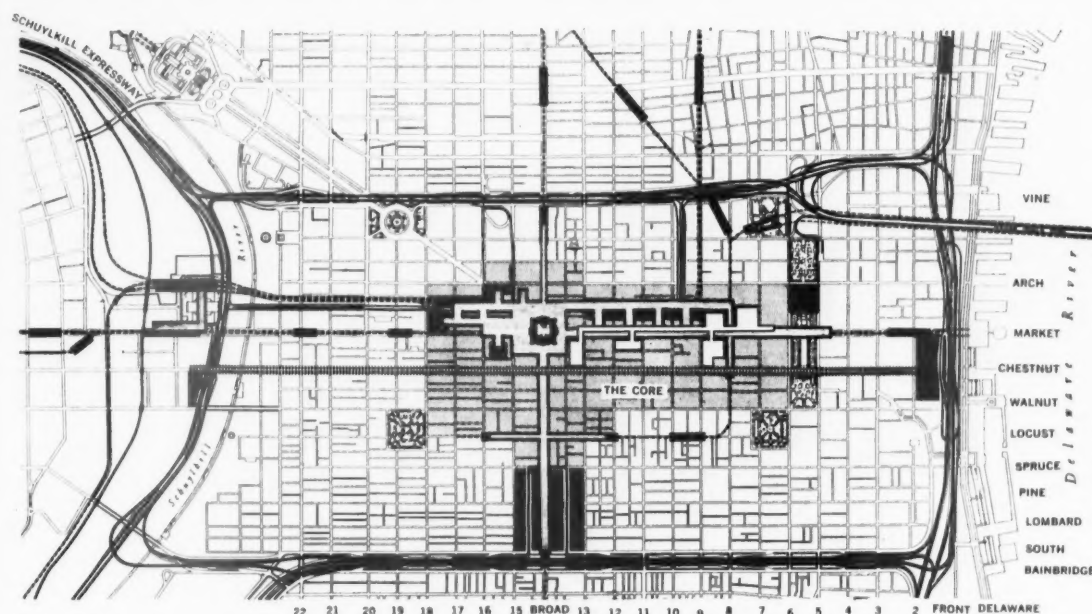
**recommend
genuine WOOD siding
by Weyerhaeuser**



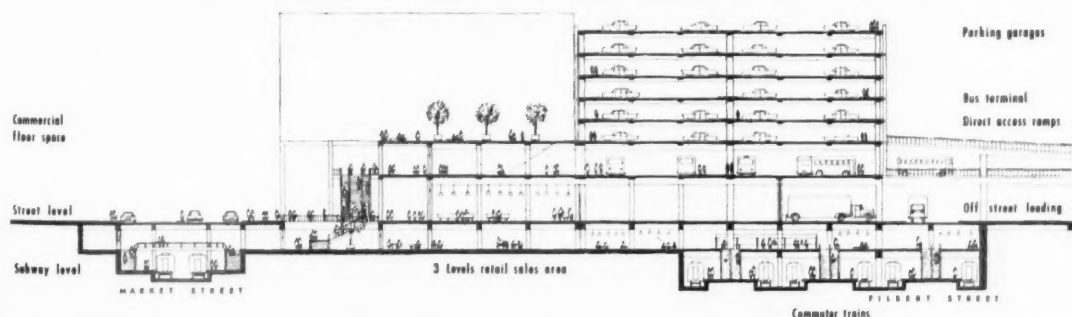
Weyerhaeuser Company
Lumber and Plywood Division



SITE PLAN OF CENTER CITY (Map: Courtesy The Philadelphia City Planning Commission.)



CENTER CITY: TRANSPORTATION NETWORK (Map: Courtesy The Philadelphia City Planning Commission.)



CROSS SECTION: shows relationship of the different levels. Beneath Market Street, the subway station opens into a lower level garden connected by shop-lined concourses with the commuter rail station to the north. At street level shops are set back under building arcades. At the upper levels they open onto a continuous walkway. Off street loading for the shops is provided from Filbert Street. The upper levels are open to the bus terminal and parking decks. These have direct ramp connections to the expressway loop. Section taken looking west. (Courtesy: The Philadelphia City Planning Commission.)

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(Continued from page 56)

to provide efficient access to any part of Center City via key exit points related directly to major parking garages at Core edge.

2 The Subway System. Improvements are scheduled by rebuilding and lengthening stations at 8th, 13th and 15th Streets. In addition, remaining elevated lines will be rebuilt as subways.

3 The Commuter Rail System. Pennsylvania and Reading lines are to be connected underground, with exits at Penn Center and Market East.

Parking planning calls for eight major terminals, with space for 17,000 cars. The terminals will be connected to the Expressway loop by access ramps and widened streets. The largest of them is to be a level 6,000 car complex located underground at Broad and South Streets near the Crosstown Expressway. A pedestrian way will connect parking with the Core. There will be additional parking complexes near the Schuylkill and Delaware rivers and at the north end of the Core, as well as one under Independence Mall.

The Pedestrian

Chestnut Street, from which cars will be barred, is to be the chief pedestrian crosstown thoroughfare. Underground concourses already at Penn Center and Broad Street will be connected with parking and will extend east as far as Independence Mall. Shops and open courtyards will be added to these concourses and an upper level promenade built, tying together department stores on both sides of East Market Street.

Open spaces

Park projects now under way to the north and east of Independence Hall will act as boundaries between the business center and a revitalized residential neighborhood known as Society Hill to the south. To the east, the Delaware riverfront will become a park, with a nautical museum and a small marina. The area west of City Hall in the Penn Center area will be landscaped to form a public plaza with fountains, and Fairmount Park, the lungs of Philadelphia, will be extended south along the Schuylkill.

Market East

Market East, the major element in the proposals for Center City, connects office areas to the south of City Hall with the department store region to the east along Market Street. When realized, it will bring the Center City-bound shopper by bus, subway, commuter line or expressway into the heart of the principal retail concentration in Philadelphia.

Principal objectives of Market East are as follows:

- 1 Distribution of arriving pedestrians along the various levels from Penn Center to Independence Mall.
- 2 Connection between Pennsylvania and Reading commuter lines.
- 3 Rehabilitation of the Market Street subway stations.
- 4 A new bus terminal designed to remove all New Jersey commuter buses from Market Street.
- 5 A parking garage for 3000 cars with direct access to the Vine Street expressway to the north of Center City.

Summary

The underlying strata of sound common sense which has characterized this vast plan was brought out in a recent statement by Edmund Bacon, the Executive Director of the Planning Commission. "The most important thing about this Plan," he said, "is that it can be accomplished within the present policies of City expenditures. What's more, the better Philadelphia this Plan will help bring about will exist not only for our children, but for this generation as well."

THE ANATOMY OF A NEW PROJECT **PREVIEW:29**

NEW HAVEN COMPREHENSIVE REDEVELOPMENT PLAN

RICHARD C. LEE

CITY PLAN COMMISSION

Christopher Tunnard, chairman

Norris C. Andrews, executive director

NEW HAVEN REDEVELOPMENT AGENCY

Harry Barnett, chairman

Harold Grabino, executive director

L. THOMAS APPLEBY, development administrator

project
mayor
planning

redevelopment

coordination

General background

New Haven, Connecticut was founded a generation or so before Philadelphia; but while Philadelphia was, in the eighteenth century, the second largest city in the English-speaking world, New Haven was at the time of the Revolution a quiet country town of 8,000 souls. The Industrial Revolution hit New Haven at about the time of the Civil War, and between 1860 and 1910 the population rose from 40,000 to 134,000 persons. The next 40 years saw the flight to the suburbs, and the ensuing stagnation of the City itself. Present population is 152,000.

The City Plan Commission was formed in 1913, and in 1941 Maurice Rotival, then on the Yale faculty, was commissioned to draw up an over-all Redevelopment Plan to supervise one prepared in 1910 by Gilbert and Olmsted. This plan had not been a success after a partial attempt at execution. In practice the 1941 plan was difficult to carry out because of the War and because this was before the days of the 1949 National Housing Act. In terms of citizens' support the Chamber of Commerce had been campaigning strongly for a general plan for redevelopment of the harbor and commercial areas. Even though work had been done under previous mayors, it was not until election of Mayor Lee in 1953 that plans began to be put into effect. Lee, who had lost the 1947 election by 712 votes and the one after by two votes, had campaigned on a platform calling for a comprehensive program of redevelopment. The use of the plan as a campaign issue helped to make voters familiar with conditions in their city.

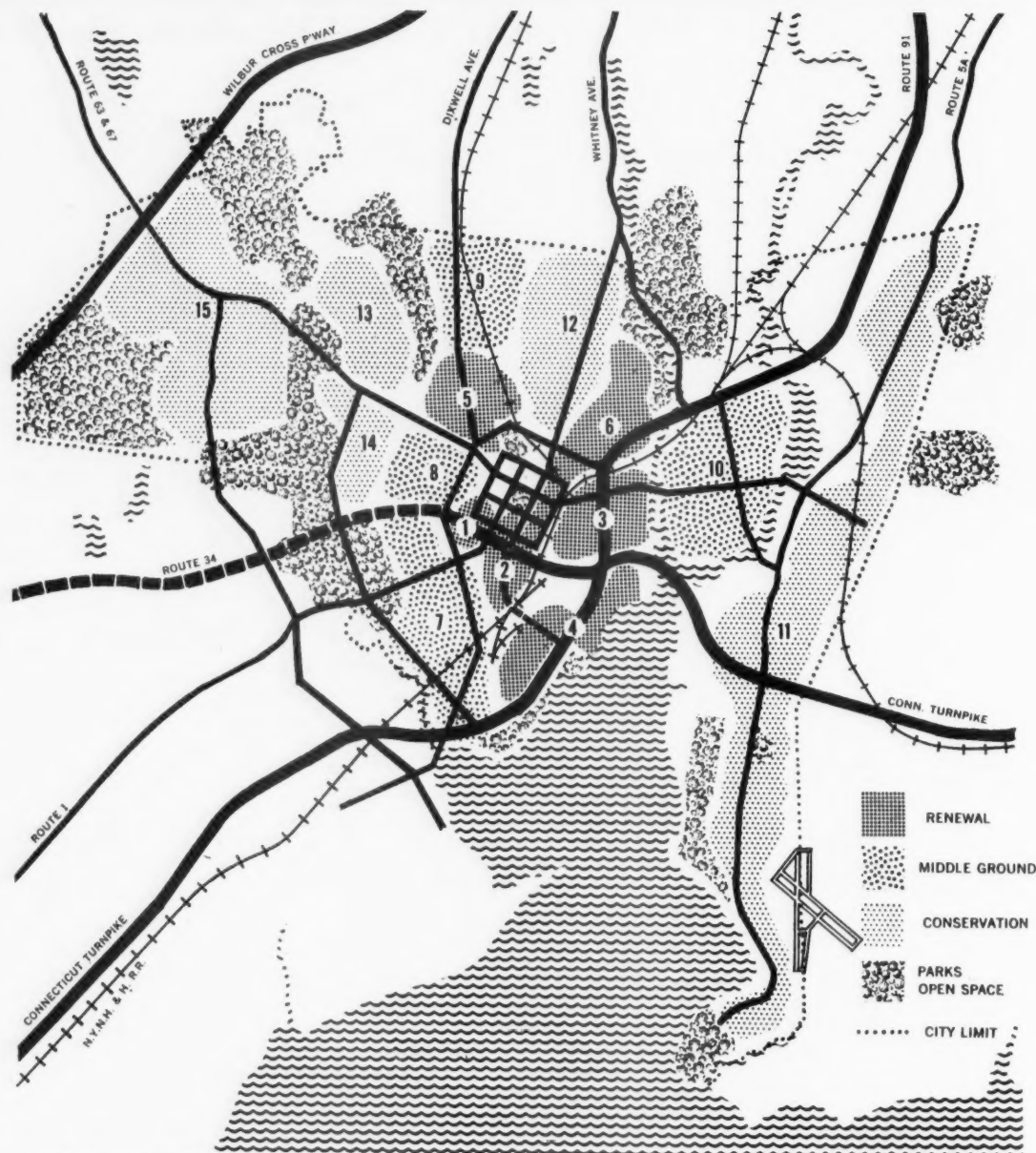
The Development Administrator, responsible to the Mayor and advised by a Code Enforcement Committee composed of City officials, coordinates a group of agencies, which include the Plan Commission, the Redevelopment Agency and the Parking Authority. The Plan Commission, whose powers are less than those of its sister in Philadelphia, is responsible for drawing the City's comprehensive Plan, including zoning, location of public improvements and community facilities. The Redevelopment Agency sees to the carrying out of renewal and redevelopment projects. It acquires property, assists in the relocation of residents and businesses and prepares land for disposition to developers.

Categories

New Haven has divided its activities into three classes, depending upon the degree of redevelopment:

1 Conservation. Certain attractive neighborhoods in the City have been designated as "conservation areas." These areas face two threats. One from conversion of large residences into small apartments; the other from external pressures of commercial expansion.

2 The Middle Ground. This involves the City's so called



CITY OF NEW HAVEN

REDEVELOPMENT AND RENEWAL AREAS: (1) Oak Street; (2) Church Street; (3) Wooster Square; (4) Long Wharf; (5) Dixwell; (6) State Street. MIDDLE GROUND AREAS: (7) The Hill; (8) Dwight School Area; (9) Newhallville; (10) Fair Haven. CONSERVATION AREAS: (11) East Shore; (12) Whitney; (13) Beaver Hills; (14) Edgewood; (15) Westville.

"middle-aged" neighborhoods, developed between 1860 and 1920. Housing in these areas is growing obsolete, and community facilities are in need of improvement.

3 Redevelopment and renewal areas. These involve total or almost total clearance. Let us discuss these in order.

Conservation

Conservation areas (areas 11 to 15, see map) require the least amount of redevelopment. To protect their integrity, zoning is to be the chief weapon. The City is concentrating on a revision of the zoning ordinance, entailing cooperation of residents. A comprehensive re-zoning program has been partially completed.

The Middle Ground

The City's Middle Ground program (areas 7 to 10) fits effectively into its present operating budget and capital budget program. Combinations of the following techniques are used in rehabilitating this kind of neighborhood:

- 1 Code enforcement
- 2 Limited clearance
- 3 New construction
- 4 Traffic and parking improvements
- 5 Home repairs
- 6 Improved municipal facilities and services
- 7 Survey of elementary school needs throughout New Haven. This will be a basis for action to meet necessary requirements for education and community facilities.
- 8 Re-zoning

In the Hill neighborhood (area 7) for example, 691 structures have been inspected by the Division of Housing Standards. Improvement work was recommended on 568. It has been completed on 216, and rehabilitation is under way on 210 others. Re-zoning has been undertaken in other sections of this neighborhood to forbid mixed commercial and residential use. In addition, a combined plan is in preparation for the Hill area and the Dwight School area (8), to serve as a guide for further progress.

Redevelopment and Renewal areas

Work in this sector started with the core of the City. Oak Street (area 1) was cleared first, followed by Church Street (area 2), which is the most ambitious project of the whole program, and will be described in more detail later. As clearance and new construction proceeded in these downtown areas, activities were extended to four other areas (3 to 6) not involving total clearance. Long Wharf (4), a vacant wasteland adjacent to the Connecticut Turnpike, is being reclaimed and prepared for commerce and industry. Wooster Square (3) is the object of a wide range of improvement methods (limited clearance, rehabilitation, new construction and improved community facilities) and is planned in conjunction with a major highway improvement—Interstate route 91. This road will separate the industrial and residential sections of the project and provide it with efficient access.

Transportation

As an important commercial and trade center New Haven requires an efficient road and rail system connecting it with the rest of the region. The City lies on the main line of the New York, New Haven and Hartford Railroad. In addition, three major highway projects are either in the planning stages or already in operation:

- 1 The Connecticut Turnpike connects the City with areas to the east and west. This was completed in 1958.
- 2 The Oak Street Connector. This connects downtown with the Turnpike, and constitutes the first mile of what will be the relocated route 34, extending to the Naugatuck Valley.

3 Interstate route 91. This is a north-south road which will begin at the Turnpike (Waterside Park Interchange) and proceed through the Quinnipiac Valley north to the Canadian border. The Quinnipiac Valley is a 13 square mile area to the north of the City. A \$60,000 planning program is under way with a view to developing the valley for industry.

Cost

Total acreage of projects now under way is 1000. New construction expenditures in the next five years are expected to reach \$150 million. Total gross cost of present projects is \$74.9 million. Proceeds from land sales amount to \$20.7 million, leaving a net cost of \$54.2 million which is being met in the following manner:

Federal Government	\$34.0 million
State and City Public Improvements	13.6 million
State cash	4.1 million
City cash	2.5 million
	\$54.2 million

Obviously, redevelopment and renewal work will provide increases in City revenue. New private construction is already said to have offset temporary tax revenue loss due to land clearance.

Church Street

	Before re-development	1960 Tax Year	After re-development @ 35.5 mills
Assessments	\$26.6 million	\$29.6 million	\$77 million
Taxes	\$944,000	\$1.04 million	\$2.7 million

The Church Street project is located at the very heart of New Haven, and contains some of its oldest areas. It also proved to be one of the most run down. Most upper stories were unoccupied. Entailing a net outlay of \$19.6 million, it is in all respects the largest of the New Haven undertakings. It has been planned in conjunction with the highway program (Connecticut Turnpike and Oak Street Connector). A series of guide plans was adopted in 1957 by the City Plan Commission and approved by the Board of Aldermen. These guide plans are the basis for future more detailed studies and form the framework of the Church Street plan. This calls for:

- a Preservation of the Central Business District in its present location, and anchoring it to the New Haven Green, to the north.
- b Provision of supporting uses to the south of the Oak Street Connector.
- c Extension of Church Street to provide fast access between the central business district and the railroad station.
- d Preservation of the adjacent Hill area (7) for residential use.
- e Provision of a school and recreational facility for the Hill area.

Substantial construction already under way is located mostly between the Oak Street Connector and the New Haven Green. Large part of this area is known as the Stevens Development and is being built by the Roger L. Stevens Corporation of New York. It will include a large department store and other shopping facilities, connected by tunnel to the expressway system. Also, the Sheraton chain will put up a hotel at the north end of the Stevens development, facing the Green. Other projects in this area call for erection of a nine story bank, an office building, a 1500 car parking garage and a covered mall.

That part of the Church Street plan situated south of the Connector calls for four major types of use:

- 1 Two new residential areas. One site will have low

cost housing for the elderly, and the other medium rent private housing.

2 A new Junior High School serving the Hill area.

3 A large commercial park, details for which are still being worked out.

4 A new Medical Center, within walking distance from the Yale Medical School and Grace New Haven Hospital.

Conclusion

Important about the New Haven redevelopment is not so much its size, which is small when compared to Philadelphia, for instance. The significance lies in the extent of the program as related to population and size of the City. It is the nature of this relationship which has made of New Haven a model for other cities of its size.



AERIAL VIEW of Stevens Development looking north across Oak Street Connector. (Courtesy of City of New Haven Redevelopment Agency.)



CHURCH STREET PROJECT AREA. (Courtesy of City of New Haven Redevelopment Agency.)

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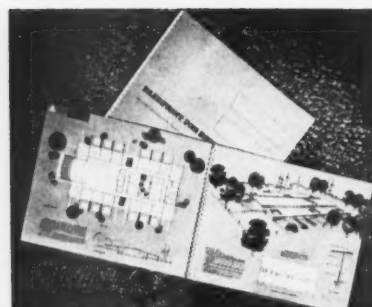
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Circle 149 for further information

82

LITERATURE

Literature cited in this department is available from various manufacturers and associations free of charge, except where indicated. To obtain copies, circle the keyed numbers on the reader service cards facing pages 1 and 114.



SCHOOL DESIGN

A colorful booklet showing how schools can be designed to meet a variety of site and functional requirements has just been released. Entitled *Blueprint For Better Schools*, the booklet features ways of using wood to produce an aesthetic, economical, efficient structure. The designs were developed by Cooper and Auerbach, AIA, of Washington, D. C. Three basic junior high school concept designs are presented: a compact structure for a level building site; a hillside school intended for rolling or hilly terrain; and a pavilion unit readily adaptable for random campus planning. Besides including isometric renderings, site plans, sketches, and detail drawings, *Blueprint For Better Schools* illustrates a wide variety of exterior siding, interior panelings, and door and window designs. The booklet also shows flat, sloping, and curved roofs supported by beam-and-purlin and beam-and-rafter systems, laminated wood bents, laminated beams, bow-string trusses, and V-arches.

AIA FILE NO. 19

ASSN: NATIONAL LUMBER MANUFACTURERS ASSN.

Circle 300



WOOD CONSTRUCTION DATA

Design of Wood Structures for Permanence is the title of booklet No. 6 in the Wood Construction Data series. Chapter headings of this booklet range from those dealing with facts about decay and termites to those dealing with pressure treated and non-pressure treated wood. Throughout the booklet are clear and easy-to-understand drawings dealing with various phases of sound construction principles. (16 pp.) Preceding volumes in the series are: *Manual for House Framing* (44 pp.); *Random Length Wood Decking* (8 pp.); *Design of Wood Formwork for Concrete Structures* (18 pp.); *Plank-and-Beam Framing for Residential Buildings* (30 pp.); and *Heavy Timber Construction Details* (30 pp.). All six volumes are now available.

AIA FILE NOS. 19-B, D

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Circle 151 for further information

LITERATURE



LIGHT-DIFFUSING GLASS

Methods of balancing illumination, and consequently improving vision, by means of light-diffusing glass, are discussed and illustrated in the Winter Issue of the architectural quarterly *Creative Ideas in Glass*. *Huewhite*, a translucent patterned glass with a milky texture that completely diffuses the light it transmits, is the subject of the current issue of the quarterly. Applications of *Huewhite* in outdoor glazing—clerestory windows, window walls, and sun shades—are illustrated, as well as indoor applications in room partitions, interior walls, and shelving. A departure from earlier issues of *Creative Ideas* is the inclusion of a semi-technical article on the subject of glare and its control. Entitled *Methods of Light Diffusion For Ideal Vision*, the article recommends that as a means of reducing extreme contrast between levels of lighting, the image of the light source be diffused to a brightness that the eye can readily accommodate. Methods of effecting this diffusion by means of *Huewhite* installations are then described and illustrated. A number of outstanding buildings making use of *Huewhite* are illustrated in the quarterly. (8 pp.)

AIA FILE NO. 26-A-9

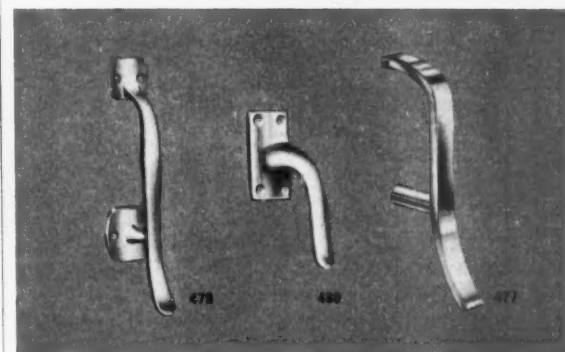
MFR: AMERICAN-SAINT GOBAIN CORP.
Circle 302

CORROSION PREVENTION

A bulletin on *Pioneer #1008 Vapor Seal*—a mastic protective coating for corrosion prevention—is now available. The product is a blend of asphalt, petroleum resins, plasticizers, asbestos, mica and solvents. Applied as a coating, it protects against rust, corrosion, abrasion, sunlight and weathering. Surfaces on which it can

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Circle 153 for further information

LITERATURE

be used include metals—tanks, bridges, siding, etc.—glass, brick, cement, fiber and a variety of insulators. The bulletin includes data on the product's physical properties; a chart for calculating the number of gallons needed to provide specific film thicknesses over unit coverage areas; application procedures; insulation values; and instructions for incorporating colored granules. (4 pp.)

AIA FILE NO. 25-B-241

MFR: WITCO CHEMICAL CO., INC.

Circle 303

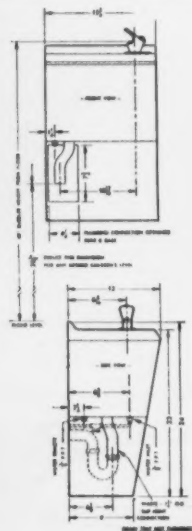
RISERS AND PLATFORMS

A current brochure describes a complete line of mobile, portable platforms, risers and accessories for band and choral concerts, shows and lectures. Basic units in three heights may be combined in an infinite number of patterns to provide every platform requirement, mfr states. Tapered inserts are available for semi-circular arrangements, plus a complete range of accessories: steps, guard rails, skirt boards and podiums.

AIA FILE NO. 14-D

MFR: HAMILTON MANUFACTURING CO.

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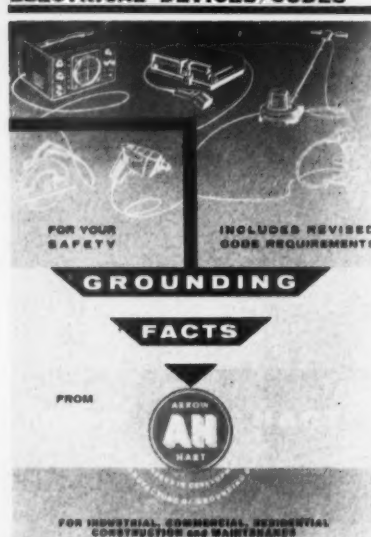


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84

ELECTRICAL DEVICES/CODES



PORTABLE CODE INFORMATION

Latest information on National Electric Code requirements most likely to affect the installation and operation of portable electric tools and equipment is available in the revised edition of *Grounding Facts*. Designed to benefit those who specify, install, use and inspect electrical appliances and equipment, the booklet interprets and clarifies revised code requirements and provides up-to-date information on new types of grounding devices developed especially to satisfy the new requirements for safety. (8 pp.)

AIA FILE NO. 40-B-2

MFR: THE ARROW-HART & HEGEMAN ELECTRIC CO.

Circle 305

CONDULET CODE

Mfr's condulets and the *National Electric Code* are discussed in bulletin 2722 which details the applications of condulets in hazardous locations. Code Articles 500-503 and 510-517 are quoted along with mfr's recommendations for condulets meeting the various Code requirements. More than 300 product photos, installation photos, and drawings illustrate this publication. (60 pp.)

AIA FILE NO. 31-C-7

MFR: CROUSE-HINDS CO.

Circle 306

SERVICE-ENTRANCE EQUIPMENT

Bulletin entitled, *Facts You Should Know About Service-Entrance Equipment*, details the operating and safety requirements of service-entrance equipment. The bulletin covers three basic functions: current-carrying efficiency (including heat rise at contacts), manual switching facility (under adverse conditions that include overloads), and speed and ca-

capacity of short-circuit interruption. It also has a section on the design provisions necessary for limiting and confining arcing during manual operation. Sample specifications are given to cover all the important operating requirements. (6 pp.)

AIA FILE NO. 31-D-4

MFR: PRINGLE ELECTRICAL MANUFACTURING CO., INC.

Circle 307

LOAD CENTERS

Complete descriptions, wiring diagrams, dimensions, and selector tables for the mfr's line of circuit breaker load centers are contained in catalog *C-200*. The catalog is designed to facilitate review and selection of the mfr's products. A simplified guide to panel selectors is featured, as well as a succinct description of the panel catalog numbering system. Advantages of the circuit breakers, load center boxes, accessories, and automatic appliance centers are listed. Full-page selector tables are included for: single phase, main lug, split bus and main breaker panels; and for three phase main lug panels. Also listed are meter socket load centers. Accessories described include unit enclosures, interchangeable raintight conduit hubs, handle ties, handle locks, sealing screws, insulated programming tool, and limiting screws. (20 pp.)

AIA FILE NO. 31-D-4

MFR: THE BRYANT ELECTRIC CO.

Circle 308

LIGHTING

LAMP CATALOG

Lamp catalog describes and illustrates line of incandescent, fluorescent, combination and magnifying lamps. Adjustable lamps are stated to be ideal for use over assembly and inspection benches, machinery, drafting tables, office equipment and in laboratories. They are available in different lengths and colors and have brackets, bases and stands which permit them to be positioned anywhere. All are UL and CSA approved. (4 pp.)

AIA FILE NO. 31-F-2

MFR: LUXO LAMP CORP.

Circle 309

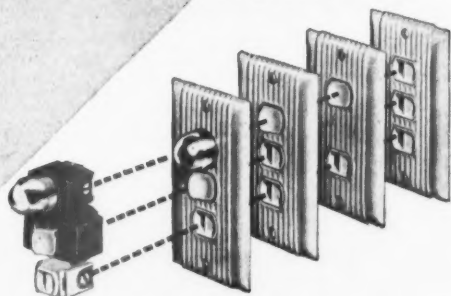
BANK LIGHTING

A current brochure on bank lighting discusses good lighting, lighting as a plus-or-minus factor, artificial lighting, ceiling lighting, contrast, the lighting engineer, and the mfr's consulting service. It includes photos taken in nine different banks. They illustrate entrance, customer-floor, consulting-room, and office lighting. They also portray both traditional and modern settings and show some half-dozen styles of lights in use un-

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LITERATURE

der various conditions of space, layout and architectural design. (4 pp.)
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MFR: HOLOPHANE CO., INC.
Circle 310



RECESSED TROFFER

Your Guide to the Latest in Recessed Lighting contains a complete illustrated description of the mfr's line of recessed troffers. In addition, completely detailed mounting information and coefficients of utilization and photometric data for each fixture, with various light controlling panels, are included. (36 pp.) A companion brochure illustrates various commercial installations. (8 pp.)

AIA FILE NO. 31-F-2
MFR: SMOOT-HOLMAN CO.
Circle 311

FLUORESCENT LUMINAIRES

Mfr's line of type-SF surface-mounted fluorescent luminaires is described in a current publication. The brochure shows typical applications and points out various features of the fixtures.

AIA FILE NO. 31-F-21
MFR: LIGHTING DIV., WESTINGHOUSE ELECTRIC CORP.
Circle 312

PLUMBING

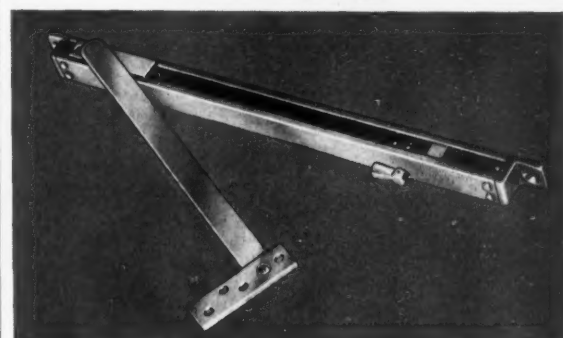


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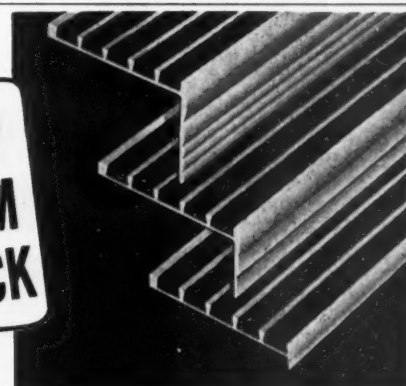
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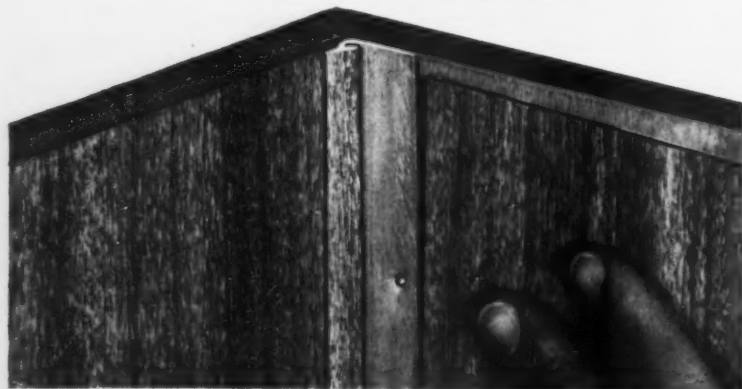
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Circle 160 for further information

LITERATURE

the reverse side of the card are data on welded flanges and fittings—size (2" to 30"), dimensions and weight per piece. Data on cast iron and steel flanged fitting, sizes 2½" to 18" are also presented.

AIA FILE NO. 29-A

MFR: ALBERT PIPE SUPPLY CO., INC.

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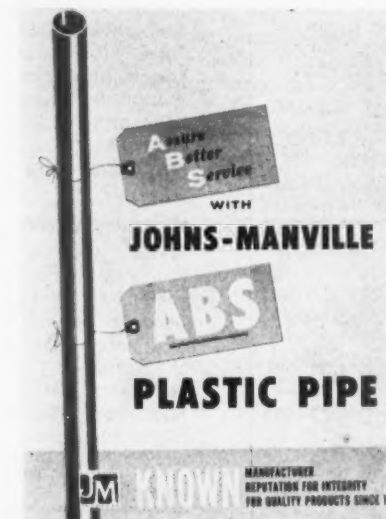
WATER DEMINERALIZERS

Bulletin No. 154 introduces a complete line of disposable cartridge-type water demineralizers for use in chemical, hospital, electronic, nuclear, laboratory research, and pilot plant operations. These demineralizers feature disposable cartridges in models up to 1,500 gallons per hour. (8 pp.)

AIA FILE NO. 29-D-3

MFR: BARNSTEAD STILL AND STERILIZER CO.

Circle 314



PLASTIC PIPE

ABS (acrylonitrile - butadiene - styrene) plastic pipe is described in brochure TR-273A. Physical properties, rated working pressures, and sizes and weights of ABS plastic pipe, as well as illustrations of the various applications of this semi-rigid pipe are included. Applications include water service, submersible pump service, irrigation and sprinkler systems, jet well settings, and natural gas lines and oil field piping. In addition, the brochure contains a step-by-step description of the recommended method for joining the pipe, including several field procedures useful in assuring leak-proof installations. (4 pp.)

AIA FILE NO. 29-B-8

MFR: JOHNS-MANVILLE CORP.

Circle 315

ICE SKATING RINKS

A booklet entitled *Steel Pipe in Ice Skating Rinks—The Story Behind a New Approach To An Old Sport*, should be of invaluable help in supplying the basic "how, why and where" of skating rinks according to the mfr. The booklet is written in non-technical language and is comprehensive enough to be of value to those involved in planning, designing, building and directing both public and commercial ice skating rinks. The booklet contains a brief history of ice skating rinks through the years. (12 pp.)

AIA FILE NO. 29-B-3

ASSN: COMMITTEE OF STEEL PIPE PRODUCERS

Circle 316

HVAC

STEAM HEATING

A recent publication, *Steam Heating Coils*, includes application information on blast heating coils, distributing tube heating coils, and dual feed distributing tube coils. It is complete with many photos and drawings and contains sections on construction details, selection, performance, piping diagrams, and installation procedures. (24 pp.)

AIA FILE NO. 29-D-2

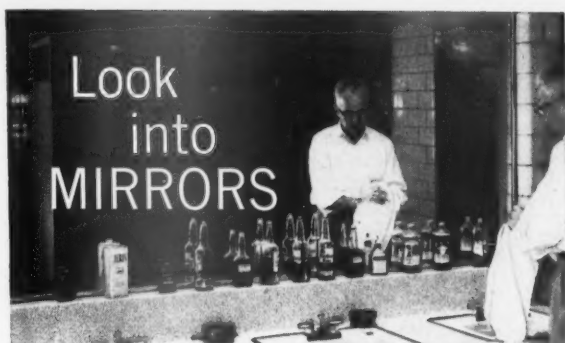
MFR: STURTEVANT DIV., WESTINGHOUSE ELECTRIC CORP.

Circle 317



ELECTRIC HEAT INSULATION

Current manual gives complete, clear explanations of the "R" factor in insulation and of the All Weather Comfort Standard as recently adopted by national electrical and insulation associations. The manual is designed to present up-to-date information on the new quality home requirements for insulating homes for electric heat, and also to present the new nationwide standards for easy reference.



by Faries-McMeekan for

INDUSTRIES



RESIDENCES



INSTITUTIONS

If you have a question regarding mirrors or would like a copy of our latest catalog be sure to write today. We offer a complete selection of framed and unframed plate glass mirrors in standard and special sizes for walls, doors and other needs. In small quantities or large—for your mirror requirements call on:

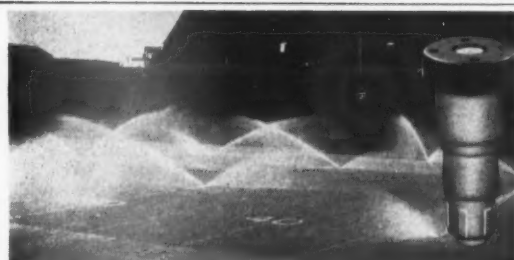


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Write for catalog

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Circle 161 for further information



When planning a lawn or turf irrigation project . . .



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SPRINKLER EQUIPMENT

. . . the complete line of lawn and turf irrigation equipment featuring Automatic Controls and Valves.

Call your nearest Weather-matic Dealer or write today for our complete catalog.

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SPRINKLER DIVISION Dallas 35, Texas

Circle 162 for further information

LITERATURE

The booklet shows how various insulation products should be specified and installed for maximum benefit. Various details of vapor barrier, ventilation and amount of insulation necessary for a given installation are also covered. (12 pp.)

AIA FILE NO. 37-A

MFR: NATIONAL GYPSUM CO.

Circle 318



SCHOOLROOM HEATING

A layman's manual on the mfr's individual schoolroom heating and ventilating systems has been announced. The manual is a presentation of the technical advantages and installation procedures of the mfr's products written in terms that the layman will understand. It is available for distribution to school administrative officials, school board members, etc.

AIA FILE NO. 30-B-6

MFR: NORMAN PRODUCTS CO., DIV., JOHN J. NESBITT, INC.

Circle 319

AIR STREAM FAN MOTORS

A color-illustrated bulletin on placement of an exhaust fan motor in the air stream is now available. Bulletin No. AS-101 contains cut-away diagram and photo to illustrate the advantages of in-air flow placement. (2 pp.)

AIA FILE NO. 30-D-1

MFR: DAVIDSON FAN CO.

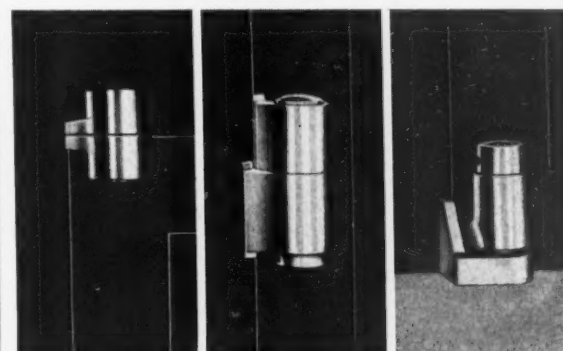
Circle 320

A/C EQUIPMENT

Profile is an illustrated brochure describing mfr's facilities, products and markets. It is designed to present an insight to users of air-conditioning, air handling, heat transfer and fluid drive equipment. The publication discusses application of equipment in modern buildings, industrial

FROM RUSSWIN

trim, attractive
pivot hinges with
built-in adjustment
for heavy doors



Top, 412

Intermediate, 413

Bottom, 414

Russwin Adjustable Pivot Hinges provide simple correction of door sag . . . permit proper weight distribution. Equipped with ball and roller bearings. Designed for life-time service on heavy doors. For details, write Russell & Erwin Division, The American Hardware Corporation, New Britain, Connecticut.

Circle 163 for further information

New!

Vitreous Enamel in 17 Radiant Colors

Add modern, eye-catching color to tablets and 3-D facade letters by specifying U.S. Bronze hard-fired, vitreous enamel. Available in 17 radiant colors plus black and white—this durable material is hard as granite and smooth as glass—requiring no maintenance or polishing.

Write today for our free illustrated color catalog plus full information on a complete line of lifetime plaques and letters available in 6 metals plus vitreous enamel—at prices to please any budget.

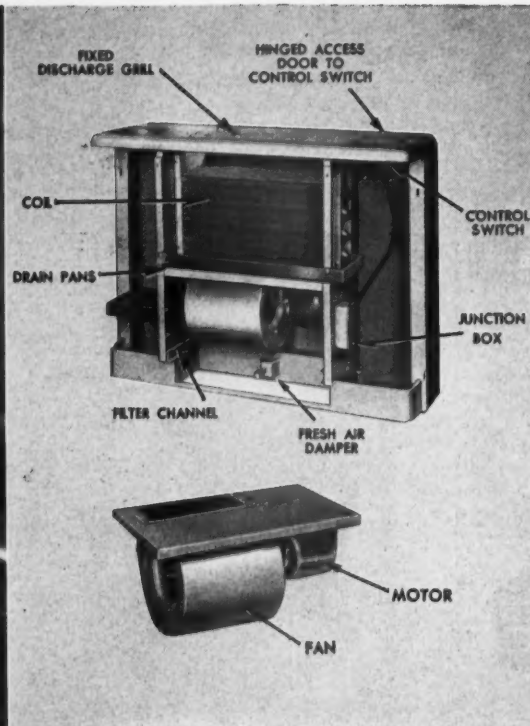
USB

UNITED STATES BRONZE SIGN CO., INC.

(Free Design Service) Dept. AE, 101 W. 31st St., New York 1, N.Y.

Circle 164 for further information

Room Comfort is Occupant Controlled



with UNIT AIR CONDITIONING SYSTEM by DUNHAM-BUSH



The Dunham-Bush unit system of air conditioning . . . with 'CR' room air conditioning units in all rooms and one central plant to handle the entire heating and cooling load . . . is ideal for any multi-room building.

Individual room control permits each occupant to select the conditions he desires—without affecting other rooms or zones. One unit handles cooling, heating and circulation of fresh, filtered air . . . quietly!

Perfectly suited for either new construction or existing buildings, the Dunham-Bush unit system requires no costly, difficult-to-install central duct system. A single piping system is utilized year 'round.

Units are available in 4 sizes from 220 to 600 CFM . . . for heating and cooling by water, direct expansion or steam; for vertical floor mounting in exposed, semi-recessed or fully recessed installation; for ceiling suspended, exposed or fully recessed installations.

Request Catalog #4014A containing complete specifications.

DUNHAM-BUSH

DUNHAM-BUSH, INC.

WEST HARTFORD 10, CONNECTICUT, U. S. A.
SALES OFFICES LOCATED IN PRINCIPAL CITIES

LITERATURE

plants, industrial processes and utility power plants. Mfr's line is described and illustrated. (20 pp.)

AIA FILE NO. 30

MFR: INDUSTRIAL DIV., AMERICAN-STANDARD
Circle 321

FAN CURBS

Bulletin No. TA-101 describes the all-aluminum *Thermal-Acoustic* curb that is stated to assure trouble-free installation of roof exhaust fans. Advantages are explained in detail; a cut-away diagram with legend, an illustration showing basic dimensions, a dimensions schedule, and a typical specification and guarantee. (4 pp.)

AIA FILE NO. 30-D-1

MFR: DAVIDSON FAN CO.
Circle 322

TILE



COLOR SELECTION AIDS

Color palettes and color selection brochure illustrate popular trend colors in glazed ceramic wall tile and ceramic mosaic patterns. Eighteen decorator selected ceramic wall and floor color combinations are presented in full color. Also, photographs of completed installations give ideas on how bathrooms, kitchens and vanity areas can be treated for maximum beauty and utility.

AIA FILE NO. 23-A

MFR: THE UNITED STATES CERAMIC TILE CO.
Circle 323

SWIMMING POOL DESIGN

An up-dated edition of the informative booklet *Ceramic Tile for Swimming Pools*, covering the planning of pools for schools, universities and institutions is now available. The basic information necessary for de-



BEAUTIFUL MARLITE PANELING for soilproof walls, easily installed

For any building or remodeling project, Marlite Paneling offers almost unlimited decorating possibilities; goes up fast over old or new walls. The baked plastic finish shrugs off grease, stains, mars—even heat! And unlike many "finished" wall panels that dull with age and damage through use, Marlite's hard, dent-resistant surface stays like new for years with an occasional damp cloth wiping. You can select from authentic Trendwood® reproductions, beautiful plain colors, distinctive marble and decorator patterns. See your building materials dealer, consult Sweet's File, or write Marlite Division of Masonite Corporation, Dept. 466, Dover, Ohio.

FREE!

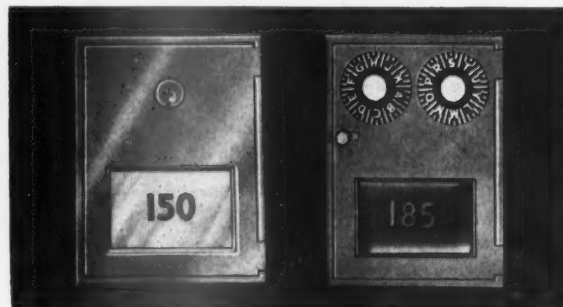
Send for new
full-color Architect's
Catalog.



Marlite
plastic-finished paneling

MARLITE IS ANOTHER QUALITY PRODUCT OF MASONITE® RESEARCH
Circle 166 for further information

For Colleges, Clubs, Apartments, Hospitals, Residential Hotels, Motels...



Corbin Letter Boxes with Modern Styling-Security-Convenience

The smooth, streamlined appearance of Corbin 150 and 185 letter boxes is more than just a style feature. It's a top security feature, too. Flush hinges make hinge pins inaccessible. Doors that close flush discourage tampering. In addition, flush mounted frame assures unobstructed opening... no jammed mail or periodicals. All Corbin boxes are cast of bronze for longest service life. Send for PLANNED MAIL HANDLING FILE, Dept. D4.



CORBIN WOOD PRODUCTS DIVISION
THE AMERICAN HARDWARE CORPORATION
NEW BRITAIN, CONNECTICUT

Circle 167 for further information

LITERATURE

termining general design, size, shape and finish for competitive and exhibition pools which must conform to the recommended standards of the A.A.U., the N.C.A.A. and the Y.M.C.A. is presented along with complete layout drawings for the several recommended types. Color photos of actual pool installations illustrate details of different types of construction and suggest distinctive design treatment for walls and surrounding areas. (12 pp.)

AIA FILE NO. 23-A

MFR: AMERICAN OLEAN TILE CO., INC.
Circle 324

TILE COLOR CHARTS

The 1961 *Asphalt Tile Color Comparison Chart* and a similar one for *Vinyl Asbestos Tile* have just been released. These charts, published annually, give the latest lineup of the various tile patterns available from each of the nine manufacturers in this country. They cover products of Armstrong, Azrock, Bonafide, Congoleum, B. F. Goodrich, Johns-Manville, Kentile, Matico and Tile-Tex. (4 pp. each)

AIA FILE NO. 23-G

ASSN: ASPHALT AND VINYL ASBESTOS
TILE INSTITUTE
Circle 325

TILE SPECIFICATIONS

A Guide To Architects' Specifications for Resilient Tile contains complete specifications for asphalt, vinyl-asbestos, solid vinyl, and Polymerite tile. Feature of the brochure is the specification for Polymerite, mfr's tile which has just been introduced at the same price level as asphalt. The brochure reveals that Polymerite conforms to the following specifications not met by asphalt: test requirements of Federal Specifications SS-T-307 for grease resistance; Military Specification MIL-T-18830 for fire resistance and wear resistance; Federal Specifications SS-T-306-b for asphalt tile. (14 pp.)

AIA FILE NO. 23-G

MFR: MASTIC DIV., THE RUBEROID CO.
Circle 326

FIRE-PROOF ROOF TILE

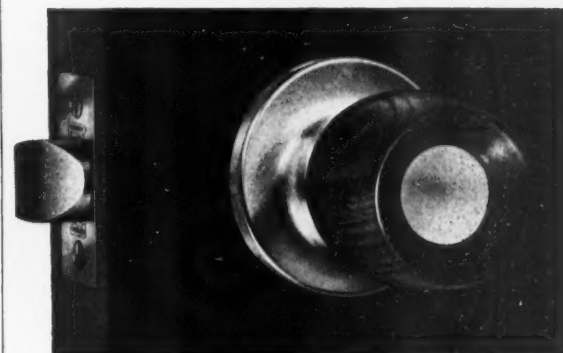
Folder *BM-243* describes *Promenade Tile*, a traffic-bearing, fire-proof roof tile of asbestos-cement. The folder illustrates some of the product's uses in providing usable roof space for commercial, industrial and recreational purposes, and gives condensed data on sizes and weights available. (4 pp.)

AIA FILE NO. 12-E

MFR: KEASBEY & MATTISON CO.
Circle 327

FROM RUSSWIN

heavy-duty
cylindrical locksets
with knobs of
rich, rare woods



Russwin Stillemaker Doorware with distinctive knobs of cocobolo, rosewood, walnut, or ebony is designed to enhance any interior. Extremely durable. Beautifully finished. Meets Federal Specification No. 161. UL listed. For details on the complete Stillemaker line, write Russell & Erwin Division, The American Hardware Corporation, New Britain, Connecticut.



Circle 168 for further information



FLAMORT WC concentrate mixed with water provides a clear solution which effectively flameproofs wood, plywood, acoustical board, paper, etc. Odorless, non-toxic solution is sprayed on before painting or varnishing, does not change color or appearance of material.

FLAMORT WC is listed by Underwriters' Laboratories and is approved by State and City Fire Marshals. Complies with Federal Specifications SS-A-118b and Uniform Building Code 1958, Sec. 4203, Table 42A, Class II.

Write Today for Case History File!



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CHEMICAL COMPANY
746 NATOMA STREET
SAN FRANCISCO 3, CALIF.

Circle 169 for further information

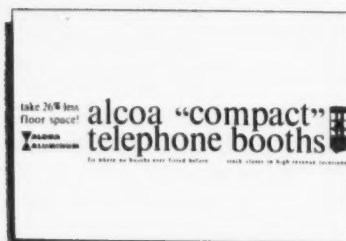


looking
for
space to
hang up
a phone?



Only 28¾ in. square! That's 26 per cent less space—for the Alcoa® Aluminum "Compact" Booth—than you need for conventional, bigger telephone booths!

Simple, clean lines and tough Alumilite® finish provide compatibility with any modern office building's décor.



REA and CSA accepted . . . inspected and approved by Underwriters' Laboratories, Inc. For the above booklet with specifications and list of jobbers, write: Aluminum Company of America, 1783-D Alcoa Building, Pittsburgh 19, Pa.

*Trade Name of Aluminum Company of America



Circle 170 for further information

LITERATURE

DOORS & HARDWARE

INDUSTRIAL DOOR CONTROLS

A line of industrial door operators and controls for all types of industrial, commercial and institutional doors are pictured and described in current folder. Graphic illustrations, cross-sections, mounting specifications, control suggestions and shipping weights for trolley, jackshaft and chain hoist operators are presented to make complete information available. (6 pp.)

AIA FILE NO. 16-D

MFR: CRAWFORD DOOR CO.

Circle 328

RESIDENTIAL LOCKSETS

A brochure describing and illustrating the *Rocket 60* residential lockset is now available. The locksets feature internal parts of Dupont Zytel nylon and are reported to offer important installation advantages. (4 pp.)

AIA FILE NO. 27-B

MFR: LOCKWOOD HARDWARE MANUFACTURING CO.

Circle 329

PLASTIC COLD STORAGE DOORS

Lightweight, low-cost plastic refrigeration doors in a choice of five colors (white, ivory, salmon, blue and blue-green) are described in full-color bulletin. It covers hinged walk-in doors, horizontally sliding walk-in doors, vertically sliding doors for package passing, and reach-in freezer doors. Specifications included. (6 pp.)

AIA FILE NO. 30-F-61

MFR: JAMISON COLD STORAGE DOOR CO.

Circle 330

CONCRETE

REINFORCED CONCRETE

A recent revision of a brochure describing the *Grid System* of reinforced concrete construction is now available. The folder presents concise, clearly illustrated descriptions of the *Grid System*, the steel *Grid* domes, and formwork and utility layouts. Also included are comprehensive typical safe load tables and typical layouts of ceilings and floors using the system. (4 pp.)

AIA FILE NO. 4-E-6

MFR: GRID FLAT SLAB CORP.

Circle 331

BRIDGE CONCRETE PROBLEMS

Case history reports of more than 200 bridge concreting problems and how they were solved are studied in this current publication. Stories of the great variety of job and weather conditions common to bridge construction portray the part played by

TECO
STANDARD
OF EXCELLENCE

in wood fasteners

TECO-U-GRIP

joist and beam hangers . . . the engineered hanger for 2x4's to 4x14's



TECO SPLIT RINGS

for economical clear span roof trusses

TRIP-L-GRIP

framing anchors . . . for stronger roof, floor and wall framing

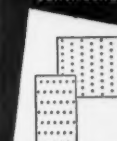


TECO H-CLIP

plywood supports . . . the NEW tighter fitting, easier installed plywood clip

TECO POST CAPS

the improved connector for post and beam construction



TECO TRUSS PLATES

for single plane trussed rafters

TECO DU-AL-CLIP

framing anchors . . . the all purpose economy framing device



TECO FAS-LOK

metal bridging . . . the fast bridging that needs no nails

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FREE
CATALOG



TIMBER ENGINEERING COMPANY 1319 18th St., N.W.

Washington 6, D. C. AEN-611

Circle 171 for further information
Architectural & Engineering News

Pozzolith concrete in meeting these conditions. Included are reports on concreting of piers and bridge decks for highway and railway bridges, hot and cold weather concreting data, the use of lightweight aggregate in bridge work, and placing and finishing problems encountered in bridge work. (16 pp.)

AIA FILE NO. 4-A

MFR: THE MASTER BUILDERS CO., DIV.,
AMERICAN-MARIETTA CO.

Circle 332

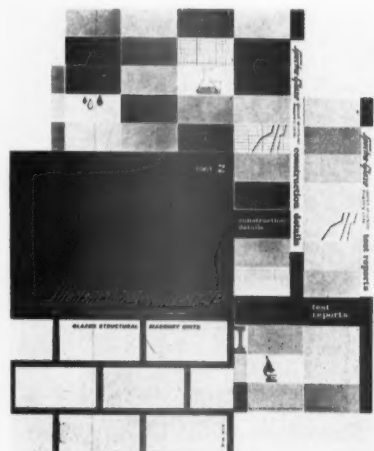
CONCRETE TANKS

A brochure on circular prestressed concrete tanks is now available. This brochure contains engineering and construction data on the basic tank elements such as the floor, base, walls and the dome or roof. The use of these tanks for water, petroleum products, chemical and liquid gas storage is discussed. There is a section on the economic advantage of prestressed tanks and a new tank capacity chart. (16 pp.)

AIA FILE NO. 4-J-1

MFR: THE PRELOAD CO., INC.

Circle 333



GLAZED BLOCK DATA

A technical brochure and file folders, *Test Reports and Construction Details*, on *Spectra-Glaze* glazed concrete masonry units are now available. The brochure describes product features and details advantages of specific shapes included among the total 37 illustrated. Color pages show the 18 standard and 26 accent colors. *Test Reports*, reprinted from consulting laboratory originals, give results of tests on all major physical and chemical properties of the glaze itself and concrete shapes finished with it. *Construction Details* contains loose-leaf sheets of drawings and descriptions of modular construction methods. (16 pp.)

AIA FILE NO. 10-B

MFR: THE BURNS & RUSSELL CO.

Circle 334

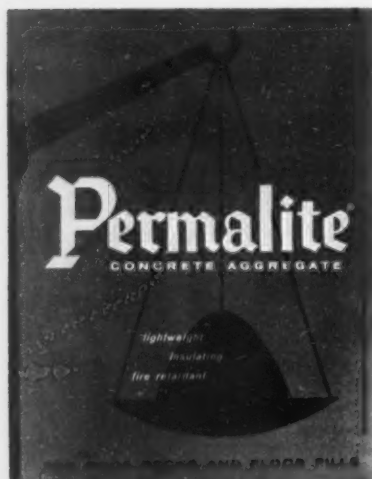
Fenestra announces
A revolutionary
new design
that transforms

*curtainwall and
roof panels into one functional,
structural element.*

turn the page and discover . . .

Circle 172 for further information

LITERATURE



INSULATING CONCRETE

The 1961 *Permalite* concrete aggregate catalog is now available. The bulletin describes the advantages of *Permalite* expanded perlite as an aggregate in lightweight concrete for insulating and light construction use, giving full details and specifications on various mix designs with their properties—weight, strength, insulation values and modulus of elasticity. The use of *Permalite* for fire-retardant, insulating roof decks is covered in detail, with diagrams and specifications on several construction methods. Floor fills and floor slab constructions are also detailed. (8 pp.)

AIA FILE NOS. 4-E-13, 37-B-2

MFR: PERLITE DEPT., GREAT LAKES CARBON CORP.

Circle 335

WATERTIGHT CONCRETE

A treatment of basic requirements for watertight concrete and *Pozzolith's* role in reducing shrinkage, bleeding and segregation to produce strong, durable structural concrete that is highly resistant to the penetration of water under normal conditions, is summarized in *The Design and Specification of Watertight Concrete*, now available. (6 pp.)

AIA FILE NO. 4-A

MFR: THE MASTER BUILDERS CO., DIV., AMERICAN-MARIETTA CO.

Circle 336

PLASTICS

PROPERTIES OF PLASTICS

Table, reprinted from *Modern Plastics Encyclopedia*, shows significant physical, electrical, chemical and optical properties of nine thermoplastic materials. Materials covered are: acrylics; acetate; butyrate; *Teflon* and *Kel-F* fluorocarbons; nylon;

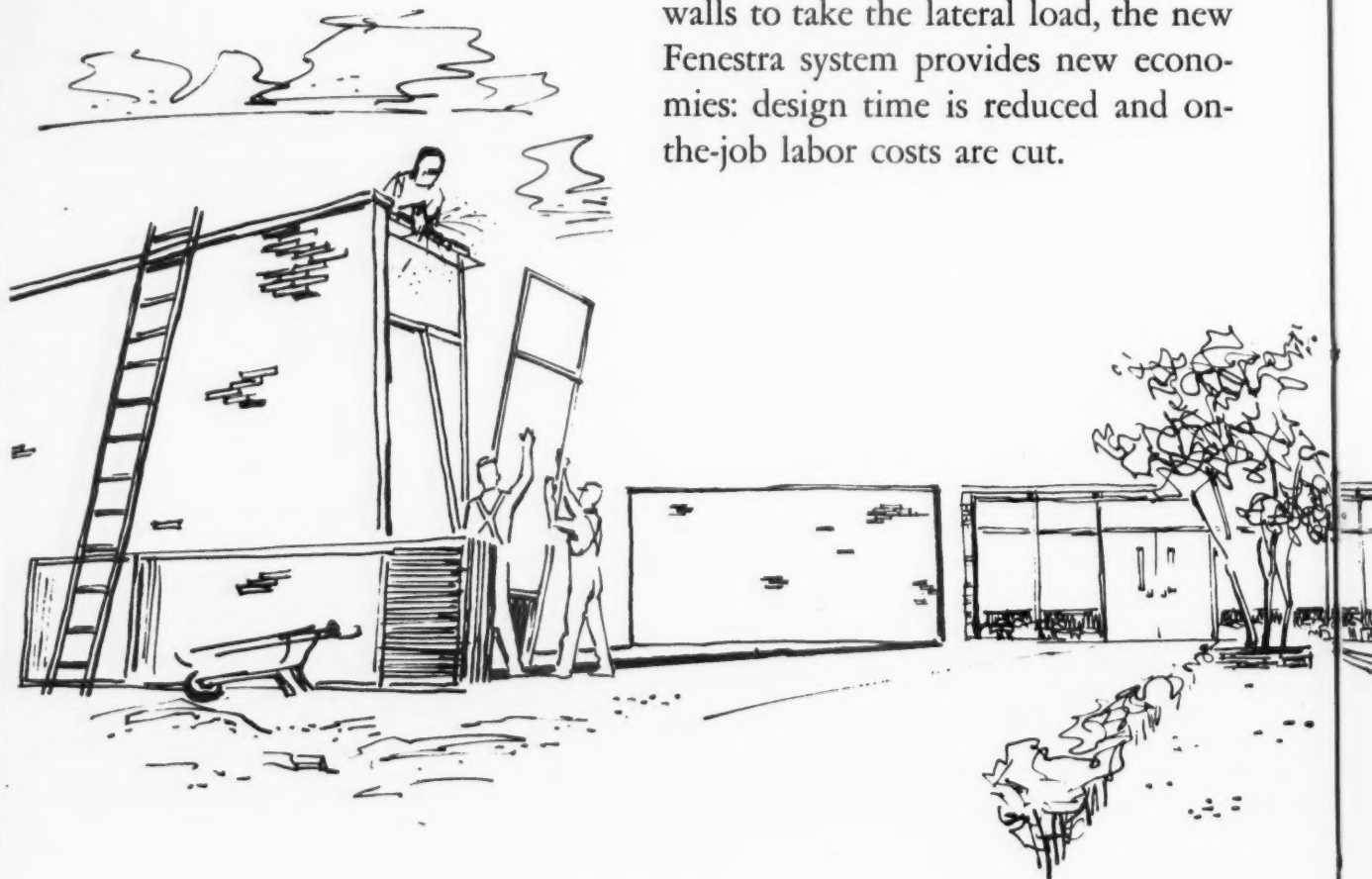
Circle 172 for further information →

NEW LOADBEARING

Fen MARK III ELIMINATES

ECONOMY

Loadbearing Fenmark III—a pre-engineered roof-wall system for one-story buildings—combines steel curtainwall and steel cellular roof panels, transforming them into one structural element. Structural steel is eliminated. With shear partition walls or end walls to take the lateral load, the new Fenestra system provides new economies: design time is reduced and on-the-job labor costs are cut.



STRUCTURAL STEEL IN ONE-STORY BUILDINGS

FLEXIBILITY

Curtainwall units come in standard and custom sizes using insulated or uninsulated porcelain panels. Mullions can be capped with aluminum, porcelain enamel, or stainless steel. Cellular roof panels provide finished or unfinished ceilings, plain or acoustically corrected. They are designed to span up to 32' with shear wall spacings to 120', accept a large variety of electrical fixtures, and furnish a low-maintenance, structural ceiling material.

ONE RESPONSIBLE SOURCE

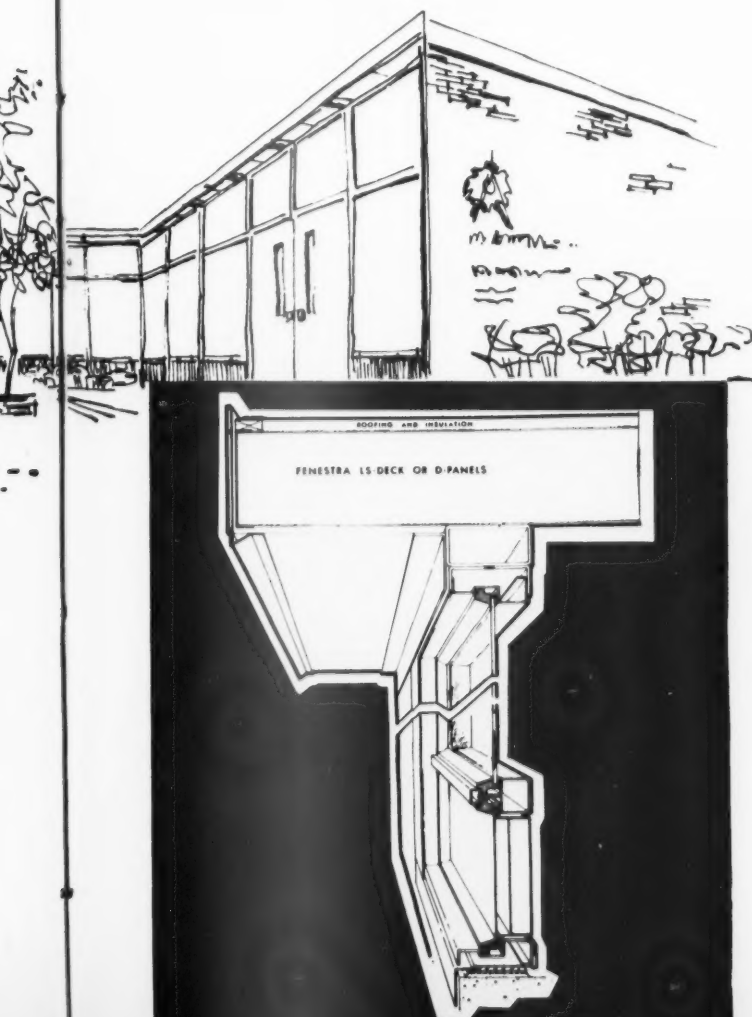
With Loadbearing Fenmark III, the entire building shell can be engineered, fabricated, and erected rapidly and efficiently by one responsible source—Fenestra. Results are fewer on-the-job delays and problems, fewer trades with subsequent cost savings. Buildings can be occupied sooner. Look into this important new design system. Contact your Fenestra representative (he's in the Yellow Pages) or mail in the coupon right now.

Fenestra

INCORPORATED

PRODUCTS FOR THE NEW AGE IN ARCHITECTURE

Steel and aluminum curtainwall systems • Structural roof-wall systems • Aluminum residential windows • Engineered windows • Hollow metal doors • Metal folding closet doors • Garage doors • Light gauge steel structural systems for floors, roofs, walls, and electrified floors.



To: Fenestra Incorporated, Dept. AE-41
11801 Mack Avenue, Detroit 15, Michigan

Please send me technical drawings and information on Loadbearing FenMARK III.

NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

COMPANY _____ POSITION _____

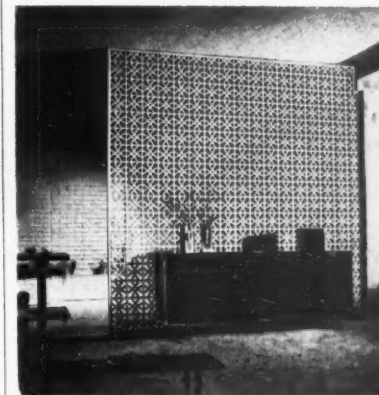
LITERATURE

polyethylene and vinyls. Data is compiled from test reports submitted by mfrs. Properties shown include: tensile, impact, flexural and compressive strength; resistance to sunlight, water, weak and strong acids and alkalis; dielectric short-time strengths and constants; power factors; machining qualities; hardness; flexibility and thermal properties.

AIA FILE NO. 24

MFR: CADILLAC PLASTIC & CHEMICAL CO.

Circle 337



PLASTIC GRILLE PANEL

Sculpta-Grille, a versatile architectural grille panel concept in sculptured plastic for interior and exterior applications, is described in a current brochure. The brochure provides information on services to architects, architectural specifications, design features and dimensions, and construction and installation data in addition to photos and drawings illustrating the variety of pattern designs. (4 pp.)

AIA FILE NO. 24-F

MFR: HARVEY DESIGN WORKSHOP, INC.

Circle 338

POLYESTER PLASTIC TILE

Glaz-Tile, a spray, brush or roller applied finishing material that dries to a colorful, durable tile-like surface on masonry, concrete, wood, metal, plaster and wallboards, is discussed in a current brochure. (4 pp.)

AIA FILE NO. 25-B-39

MFR: PLASTIC KOLOR, INC.

Circle 339

POLYSTYRENE APPLICATIONS

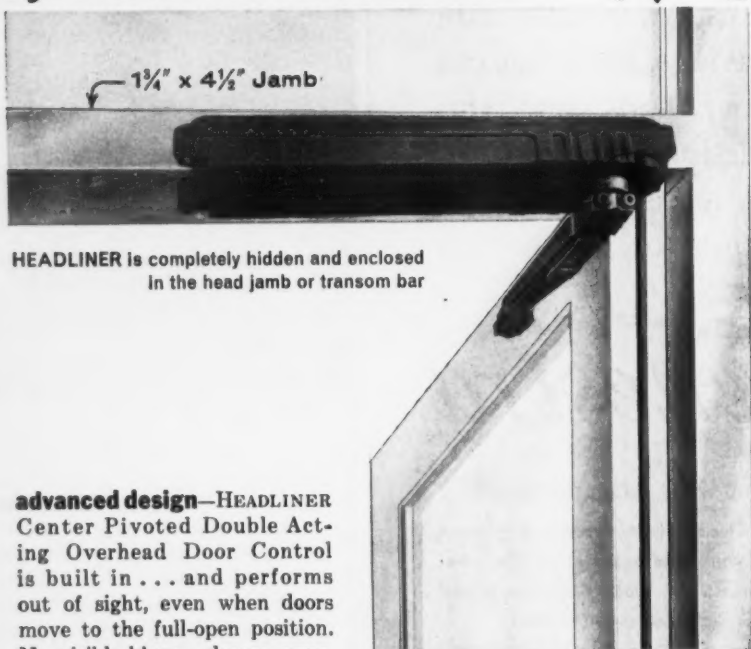
The availability of a booklet which describes expandable and expanded polystyrene is announced. The applicability of regular and self-extinguishing *Uni-Crest* to the construction, refrigeration, air-conditioning, flotation, and packaging fields is illustrated. Pre-expansion and molding of the material are also dis-

← Circle 172 for further information

positive overhead door control
that's hidden from view

Headliner®

by **DOR-O-MATIC**



HEADLINER is completely hidden and enclosed
in the head jamb or transom bar

advanced design—HEADLINER Center Pivoted Double Acting Overhead Door Control is built in . . . and performs out of sight, even when doors move to the full-open position. No visible hinges, closers, arms, or holders interrupt the beauty and clean lines of doors and frames. Here is highly efficient door control concealed in any head jamb or transom bar as slim as 1 3/4" x 4 1/2". HEADLINER sets the scene for good doorway design . . . entrance, vestibule, interior . . . in any building and at lower cost than with many other types of door closers.

performance—The advanced new HEADLINER Overhead Door Control operates smoothly and quietly. Cushioned positive back stop and optional hold-open may be obtained at either 90° or 105°. HEADLINER also features positive centering and no accidental hold-open. The HEADLINER provides positive control . . . throughout opening and closing cycles for double or single acting doors. Simple, accessible two-speed closing and spring force adjustments are provided.

installation—The HEADLINER is designed for packaged unit construction so the complete doorway—frame with pre-installed HEADLINER and door—is quickly installed. Gone is the usual time-consuming preparation. One trip completes the installation . . . the door is securely set in the frame in seconds with the HEADLINER Fast-Set Arm and Pivot.

For the full story, write to Dor-O-Matic today for HEADLINER literature.



DOR-O-MATIC

Division of REPUBLIC INDUSTRIES, INC.

7348 West Wilson Avenue • Chicago 31, Illinois 9620

CANADA: Dor-O-Matic of Canada, Ltd., 550 Hopewell Ave., Toronto 10, Ontario

Circle 173 for further information

94

LITERATURE

cussed. Mfr states that self-extinguishing *Uni-Crest* has opened vast areas of use, previously closed to regular polystyrene. (8 pp.)

AIA FILE NO. 23-L

MFR: UNITED CORK COS.

Circle 340

MARINE PLASTICS

A technical bulletin, *Design of Floating Structures with Styrofoam* is now available to architects and marine designers. The illustrated bulletin presents design considerations and application information based on 15 years of field experience. Separate sections are devoted to a summary of flotation applications using *Styrofoam*, design and installation considerations, and field performance reports. (24 pp.)

AIA FILE NO. 32-A

MFR: THE DOW CHEMICAL CO.

Circle 341

WOOD

PAINT-PRIMED REDWOOD

This brochure includes a sample of the *Palcote* paint-primed redwood siding and a technical bulletin giving full description, plus cost-saving data. The process uses the Swiss Steinemann curtain coater to apply a high-grade, durable exterior paint-primer to the lumber.

AIA FILE NO. 19-A-4

MFR: THE PACIFIC LUMBER CO.

Circle 342

WOOD PANEL UNDERLAYMENT

Current brochure describes *Versabord*, an all wood panel product used as underlayment in floors and counter tops and as cabinet parts, shelving, closet doors, and wall paneling. Properties, instructions and recommendations for installing *Versabord* underlayment in the floor system are presented. (4 pp.)

AIA FILE NO. 19-E-6

MFR: SILVATEK DIV., WEYERHAEUSER CO.

Circle 343

METALS

ALUMINUM BUILDING PRODUCTS

Availability of six booklets on architectural and industrial building products announced. *Gravel Stops and Copings* (4 pp.) concisely presents details and specifications on seven types of systems. A wide selection of industrial products is shown in *Industrial Building Products* (36 pp.). Included are details on corrugated roofing and siding, sandwich wall, perforated corrugated sheet, field formed flashing, fasteners, and a roofing and siding check

list. *Roofing and Siding Products* (8 pp.) presents clear descriptions, specifications, and installation data on various roofing products. *Exterior Wall Products* (8 pp.) covers wall panels and screen systems. *Aluminum Products for Industrial Building Construction* (8 pp.) features data on stair treads, tread plate, pipe railings, rigid conduit, bus conductors, vault frame sections, structural shapes and access ladder components. *Aluminum in Architecture* (8 pp.) provides guide to advantages of aluminum, its specifications, finishes, and properties, and offers an aid to alloy selection.

AIA FILE NOS. 12-L, 12-C, 17-A, 14-D, 15-J

MFR: ALUMINUM CO. OF AMERICA

Circle 344

STAINLESS STEEL

The *Stainless Steel Architectural Quarterly* for winter is now available. Featured in this issue are: the new Union Carbide Corporation Building, information and detail drawings; how stainless steel was employed to repair the U. S. Capitol Building dome; and an example of curtain wall flexibility at Idlewild Airport. (8 pp.)

AIA FILE NO. 15-H-1

ASSN: AMERICAN IRON AND STEEL INSTITUTE

Circle 345

STAINLESS STEEL WELDING

Information concerning techniques for welding stainless steel is contained in bulletin 7300.2 entitled *Arc Welding Stainless Steel*. This bulletin gives physical properties, structure, and welding characteristics of the different types of stainless steels. It also has a chart listing deposit properties and electrode recommendation tables for the different types of stainless steel. (12 pp.)

AIA FILE NO. 15-H-1

MFR: THE LINCOLN ELECTRIC CO.

Circle 346

OFFICE PRACTICE



OFFICE PROBLEMS

A current booklet, *How To Solve Office Problems On The Spot*, lists hundreds of cost-saving techniques for the office. It analyzes office time and

materials waste and details systems and equipment which will free executives and office staff from routine, time-consuming procedures. (16 pp.)

AIA FILE NO. 35-H-4

MFR: TRANSCOPY, INC.

Circle 347

SINGLE CONTRACT SYSTEM

Contract awarding authorities from private industry and from all levels of government are quoted as supporting the single contract method of construction in a current brochure. Titled, *Save Construction Dollars with America's Basic Construction Method, The Single Contract System*, the brochure states that about 95 per cent of federal contracts and 85 per cent of the states use the single contract method, as well as the overwhelming majority of local government and private contract awarding authorities.

AIA FILE NO. 40-A-1

ASSN: THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA, INC.

Circle 348

COMMUNICATIONS



AUTOMATIC SERIES

ST. CHARLES, ILLINOIS

HOSPITAL COMMUNICATIONS

A current brochure on hospital communications describes and illustrates the most wanted services. The folder explains audio-visual automatic nurses' call equipment for nurse-patient and staff communications; automatic, patient, bedside monitoring and multi-channel music/program distribution systems. (6 pp.)

AIA FILE NO. 31-i-1

MFR: DUKANE CORP.

Circle 349

SIGNALING DEVICES

Catalog *BSM* describes electrical signaling equipment, annunciators, apartment house mailboxes, non-electric door chimes, and apartment house bell systems. The catalog pro-

SPEEDRAMP PASSENGER CONVEYOR SYSTEM NEW SHOPPING CENTER CUSTOMER CONVENIENCE

SAN DIEGO, CALIF.—College Grove Center features identical SPEEDRAMP Passenger Conveyor Systems moving pedestrian traffic between upper and lower levels at the city-size shopping center.

College Grove Center is San Diego's first regional shopping center and 37th in the nation. The new shopping center has the distinction of having the first twin SPEEDRAMP Conveyor installation anywhere in the country.

Customers ride the twin 30 inch wide units a distance of nearly 75 feet up a 13½ degree incline. A constant flow of pedestrian shopper traffic is carried to and from the general mall area and the lower shopping level which is 17 vertical feet beneath the upper level. Handling as many as 7,200 passengers per hour, the SPEEDRAMP Conveyors offer the ultimate in passenger safety and convenience.



WRITE FOR
BULLETIN 1060



SPEEDWALK DIVISION STEPHENS-ADAMSON MFG. CO.

GENERAL OFFICE & MAIN PLANT, 72 RIDGEWAY AVENUE, AURORA, ILLINOIS

PLANTS LOCATED IN: LOS ANGELES, CALIFORNIA • CLARKSDALE, MISSISSIPPI
BELLEVILLE, ONTARIO • MEXICO CITY, D. F.

SEE THE MONTGOMERY ELEVATOR COMPANY REPRESENTATIVE OR THE
STEPHENS-ADAMSON REPRESENTATIVE IN YOUR AREA.

how to Watch without being Seen

Rose-Mary Home for Crippled Children, Cleveland, O.



From the corridor, it's a window in the door... ↑



From the Therapy room, it's a mirror! ↑

Mirropane® the "see-thru" mirror, has many uses... in hospitals, schools, banks, stores, homes... anywhere you want to observe—in person or with a camera—without being seen. When **Mirropane** is made with regular plate glass, a light intensity differential of about 7 to 1 is required. For best performance, **Mirropane** made with

Parallel-O-Grey® polished plate glass is recommended. This reduces the light intensity differential to about 3 to 1.

For complete information on "see-thru" mirrors, call your L·O·F distributor or dealer (listed under "Glass" in the Yellow Pages), or write L·O·F, 841 Libbey·Owens·Ford Building, Toledo 1, Ohio.

MIRROPANE

the "see-thru" mirror

LIBBEY·OWENS·FORD



Circle 175 for further information
96

LITERATURE

vides full information and pricing on signaling and hardware products including bells, buzzers, chimes, horns, push buttons, transformers, hold-up alarms, fire alarms, supervisory annunciators and lamp annunciators. (30 pp.)

AIA FILE NO. 31-i-13

MFR: PRODUCT DIV., AUTH ELECTRIC CO., INC.

Circle 350

MISCELLANY



PLAQUES AND LETTERS

Full-color booklet describes and illustrates precision-cast, hand-tooled bronze, aluminum, and vitreous enamel-filled tablets, plaques and letters. Included are diagrams of borders and installation methods; a special page on the *Fascia* letter, with list of sizes; information on the 17 colors (which are shown) in which vitreous enamels are available. Firm's many letter styles are fully depicted and available dimensions given. (8 pp.)

AIA FILE NO. 15-R

MFR: UNITED STATES BRONZE SIGN CO., INC.

Circle 351

ELEVATOR MAINTENANCE

How elevator maintenance protects a building's earning power and market value is outlined in words and photos in a booklet, *Protecting A Vital Building Service*. Proper care not only safeguards elevator service, but also prevents costly repairs, the publication points out. At the same time, a balanced maintenance program avoids spending too much on elevator upkeep. A preventive maintenance program organized to protect elevators at economical cost is described. On-the-job photos show typical steps in an efficient "pit to penthouse" procedure. (24 pp.)

AIA FILE NOS. 33-B, C

MFR: OTIS ELEVATOR CO.

Circle 352

LIGHTWEIGHT AGGREGATE

1961 issue of the *Perlite Lightweight Plaster Aggregate Catalog* is now available. It describes in detail specifications for perlite covering

If optimum
corrosion
resistance
is your
flooring
problem...



is your
answer!

Revolutionary New Epoxy
Grout and Setting Compound
Makes Joints as Impervious
to Corrosion as the Tile Itself!

Ideal for dairies, packing plants, canneries, bakeries, breweries, distilleries, food processing plants—wherever corrosives are encountered. Forms a dense, tight joint of phenomenal strength. For new installations or re-grouting existing floors. Only water is needed for clean-up. Details in Sweet's or write for a descriptive catalog.



Pioneers in
Industrial
Research
Since 1881

THE UPCO CO.

4805 Lexington Ave. Cleveland 3, Ohio

Circle 176 for further information
Architectural & Engineering News

materials, basecoat, recommendations, finish coat application as well as mix proportion, thermal conductivity and sound reduction data. In addition, data is provided for lightweight fireproofing of walls and partitions, ceilings, columns and beams with detailed drawings. Data on the use of perlite-Portland cement plaster for curtain wall back-up systems and perlite acoustical plaster is also included. (4 pp.)

AIA FILE NOS. 21-A-5, 21-C-1

ASSN: PERLITE INSTITUTE, INC.

Circle 353



SILICONE INFORMATION

A comprehensive booklet on silicones containing the most recent and advanced information on these chemicals has just been issued. Graphically illustrated with photos, charts and graphs, the booklet goes into detail about what silicones are, describes their manifold uses, and suggests ways in which they can be adapted to new applications by the designer. A series of charts covers the properties and features of mfr's silicone fluids, resins, rubber compounds, water repellents, anti-foams and emulsions. (16 pp.)

AIA FILE NO. 25-A-3

MFR: SILICONES DIV., UNION CARBIDE CORP.

Circle 354

LOW FIRING PORCELAIN ENAMEL

Porcelain enamels for steel with firing temperatures 500° below conventional enamels is the subject of a supplement to *Lead in the Ceramic Industry*. Because these new enamels fire at only 1000 to 1100°, drastic reductions in furnace costs, maintenance and fuel costs are possible, according to the publication. Products with complicated shapes which formerly were impossible to coat with conventional porcelain enamel can

Circle 177 for further information →

Upon reflection,
your best selection for roof decks

INSULROCK.

With its new,
exclusive factory-finished ceiling surface

INSUL-GLO 70

40 to 70% light reflectance possible from beautiful exposed ceilings when you specify INSULROCK for your roof decks. Insul-Glo 70, developed by Flintkote, coats the underside of INSULROCK with a new, white, bright light-reflecting factory finish.

Lasting beauty comes bonded into INSULROCK's ceiling surface. An exclusive, indurating, cementitious coating keeps your handsome ceiling smooth, tough, and abrasion-resistant during application and for years of service.

INSULROCK, of course, is a strong, non-combustible, economical single-unit roof deck. Its factory-controlled quality assures uniformly high insulation and acoustical performance. INSULROCK answers all your roof deck requirements for many-duty strength and beauty.



Manufacturer of
America's Broadest Line
of Building Products

INSULROCK COMPANY

Division of The Flintkote Company

Executive Office: New York, New York

General Sales Office: Richmond, Virginia

Main Office: North Judson, Indiana • Richmond, Virginia

District Sales Offices: Chicago, Illinois; Cleveland, Ohio; Dallas, Texas; Greensboro, N. C.; Los Angeles, Calif.; New York, N. Y.

*A trademark of The Flintkote Company

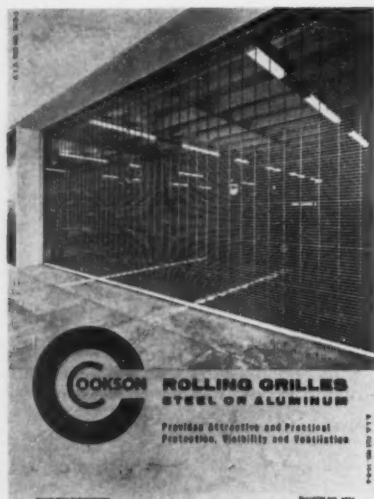
LITERATURE

now be coated with the 1000° porcelain enamels. Processing details and possible areas of difficulty are discussed in this supplement. (4 pp.)

AIA FILE NO. 15-M-1

ASSN: LEAD INDUSTRIES ASSOCIATION

Circle 355



ROLLING GRILLES

Line of modern design steel and aluminum rolling grilles are fully described and illustrated in current bulletin. Principal applications of grilles are for banks, schools, churches, garages, industrial plants, etc., where a practical rolling enclosure is required that combines the qualities of easy installation, strength, security against entry, full visibility and free ventilation. Complete specifications are included, with detail drawings covering all types of standard and special situations. (4 pp.)

AIA FILE NO. 14-B-6

MFR: THE COOKSON CO.

Circle 356

ABRASIVE PRODUCTS

Abrasive Products for the Construction Trades catalogs a complete line of abrasives and related products for the masonry and concrete trade. A reliable, quick-reference handbook based on more than 60 years of abrasive experience, according to mfr. (42 pp.)

AIA FILE NOS. 3, 4

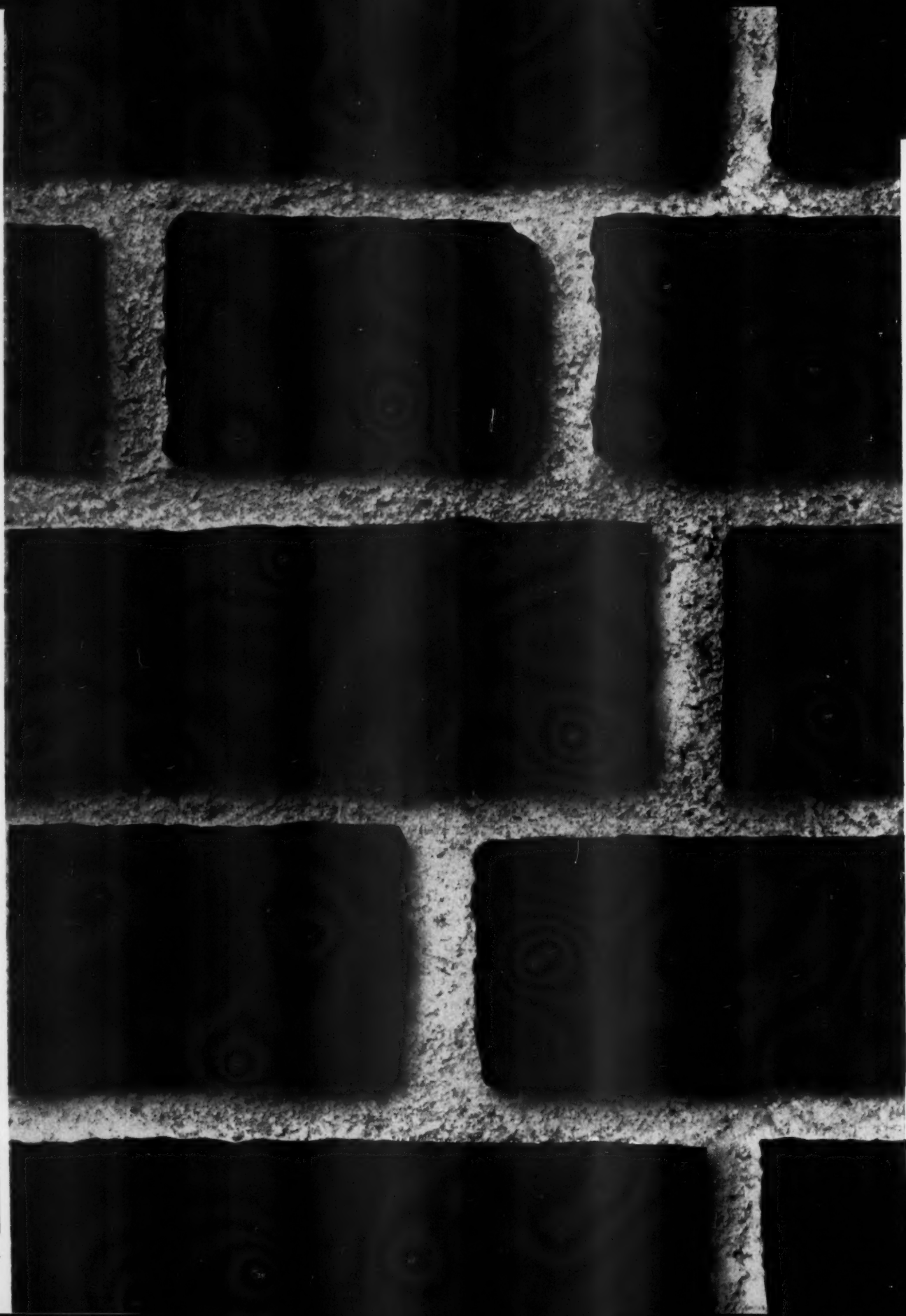
MFR: THE CARBORUNDUM CO.

Circle 357

RIGID-FRAME BUILDINGS

A descriptive brochure on pre-engineered rigid-frame steel buildings has just been issued. Buildings are applicable for commercial, industrial and agricultural installations. They can be erected in a few days, yet are

Circle 178 for further information →



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NEW MASONRY WATER REPELLENT

An Overnight Sensation in the Building Industry!

HYDROCIDE® S-X HYCON®

The most effective and durable Silicone masonry water repellent available today!

The all-new HYDROCIDE S-X HYCON is the talk of the Building Industry. And no wonder; when you take an already superior product such as HYDROCIDE S-X (one of the first in the field) and have experienced Sonneborn waterproofing engineers give that product additional important qualities, you are bound to have a news-making product.

A Sonneborn development, HYDROCIDE S-X HYCON is far more effective and much longer lasting under the severest conditions than any silicone water repellent previously available. Its superior formulation is derived from Sonneborn's use of the Hycon Silicone molecule that develops a tighter grip on the masonry surface. Hence these superior qualities:

1. LONG LASTING . . . DEEP PENETRATION . . . POSITIVE PROTECTION . . . Tests prove that a single application provides complete treatment and immediate water repellency on most masonry surfaces for a much longer period of time than any previous water repellent.

2. EASY TO APPLY ALL YEAR ROUND . . . HYDROCIDE S-X HYCON because of its superior quality is easy and fast to apply by brush or spray all year round. Where subsequent painting of the masonry is desired it can be easily painted over and does not interfere with the bond of oil base paints.

3. PROTECTS AGAINST DIRT AND EFFLORESCENCE . . .

HYDROCIDE S-X HYCON helps preserve the original appearance of exterior walls by excluding atmospheric moisture and minimizing the adhesion of air-borne dirt which stain or darken most surfaces; and helps reduce the possibility of surface salt deposits, spalling and cracking of masonry caused by freezing and thawing.

4. PERMITS "BREATHING" . . . HYDROCIDE S-X

HYCON permits masonry to "breathe" since it does not plug or smother the masonry pores. It simply imparts long-term water repellency to the inner surface of these pores. Result: Moisture in the liquid phase cannot enter, yet moisture in the wall can easily escape or "breathe" out as water vapor.

5. INSURES DURABILITY OF INTERIOR FINISHES

HYDROCIDE S-X HYCON applied to the exterior wall surface minimizes risks of moisture moving through the wall to the interior face. Damages to the interior wall surface such as dampness, peeling of wall paper, blistering of paint and unsightly efflorescence are thereby reduced.

For more information on HYDROCIDE S-X HYCON write today for your copy of our 8-page, illustrated brochure BP3062 or, see our catalog in Sweet's Architectural File 9/So.



**SONNEBORN
CHEMICAL AND REFINING
CORPORATION**

Building Products Division, A41
404 Park Avenue South, New York 16, N. Y.
HOUSTON, CHICAGO, LOS ANGELES, TORONTO

LITERATURE

permanent, mfr states. Buildings have rigid steel frames and are available in galvanized or vinyl coated, formed steel panels or industrial corrugated aluminum in a wide variety of colors.

AIA FILE NO. 17

MFR: APEX STANDARD STEEL BUILDINGS

Circle 358

MASONRY WALL REINFORCING

A study on wall reinforcing entitled, *Investigation of Continuous Metal Ties as a Replacement for Brick Ties in Masonry Walls* is now available. The study was prepared for the mfr by the Armour Research Foundation Institute of Chicago. Purpose of the study was to compare the relative merits of the brick header course in wall construction with continuous wire reinforcement. Studies were made of flexural strength vertically, compressive strength and water permeability. (44 pp.)

AIA FILE NO. 5-F

MFR: DUR-O-WALL DIV., CEDAR RAPIDS BLOCK CO.

Circle 359

SAFETY ENCLOSURES

The *CBR System* was specifically designed and arranged to act as a basic building block upon which any laboratory could initiate and practice all types of laboratory techniques. A current manual describes the System and its advantages, and provides information on how to order; system specifications; radiochemistry, bacteriology and virology, and remote control laboratories; ventilation data; controlled atmosphere laboratories; *CBR* basic laboratories, parts and accessories, etc. (32 pp.)

AIA FILE NO. 35-E

MFR: SCIENTIFIC EQUIPMENT DIV., KEWAUNEE MANUFACTURING CO.

Circle 360

ASBESTOS-CEMENT PRODUCTS

A comprehensive manual covering mfr's entire line of asbestos-cement products has been released. Showing various siding and roofing styles and textures in all available colors, the booklet also gives necessary specifications and pertinent data on lightweight corrugated asbestos-cement *Economy 250* sheeting, and asbestos-cement flat sheets. Federal specifications met are shown for each product, and accessories are listed. Numerous photographs and drawings suggest various uses.

AIA FILE NO. 12-B

MFR: NATIONAL GYPSUM CO.

Circle 361

← Circle 178 for further information

DOCUMENTS

The documents listed below are available through the associations and agencies cited. All requests should be directed accordingly.

Committee for Economic Development, 711 Fifth Ave., New York 22, N. Y.

Guiding Metropolitan Growth. 1960. 56 pp. \$2.00.

A presentation of four ideas to help solve the growth problems facing communities throughout the country. Contains charts and tables.

The Changing Economic Function of the Central City by Raymond Vernon. 1959. 92 pp. \$1.00.

An analysis of the rapid changes that are altering the economic functions of our great central cities and causing a decline in urban population along with increasing problems in the "gray zones" and the suburbs.

Building Research Advisory Board, National Academy of Science, National Research Council, 2101 Constitution Ave., Washington 25, D. C.

School Fires: an Approach to Life Safety, Publication No. 832. 1960. \$2.50.

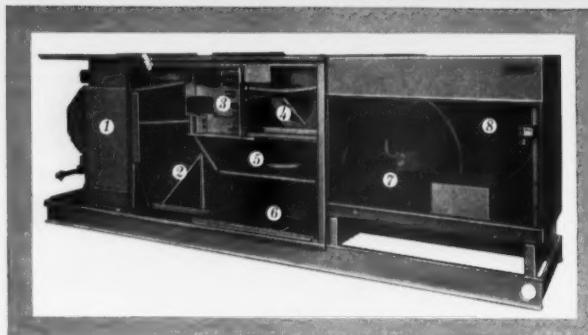
The special committee appointed to direct preparation of this report drew upon the guidance of leaders in education, architecture and engineering, and fire safety, together with building codes officials and others having a special concern with major aspects of the problem of school fires. The report presents a statement of current knowledge and needs regarding buildings, equipment, and personnel, together with a sound approach to insuring life safety in schools. Contains many drawings and photographs.

Residential Building Sewers, NAS-NRC Publication No. 787. 1960. \$2.00.

This report deals with the use of pipe made from asbestos-cement, bituminized fiber, cast iron, plastics, and vitrified clay—and the jointing methods and materials and installation procedures used with each. Also treated are plumbing codes, existing standards, causes of failure, and needed inspection and maintenance procedures.

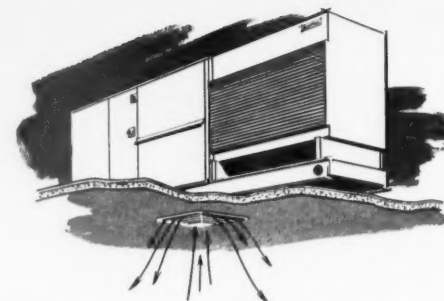
Small-Size Pipe for Sanitary Lateral Sewers, NAS-NRC Publication No. 507, Revised. 1960. \$1.50.

Contains recommendations regarding the minimum-size pipe to be al-



SKYLINER FEATURES

- 1 **Armor-coated heating section**—gas-fired, two-pass, heavy-duty type, with all joints and surfaces coated, inside and out, with fire-fused A-19 corrosion resistant ceramic coating. A.G.A. approved.
- 2 **Cooling evaporator coil**—aluminum finned-copper tube type for peak performance. Located downstream of heating unit, adjacent to outlet.
- 3 **Factory-wired electrical panel**—standardized and tested to simplify installation and eliminate costly troubleshooting.
- 4 **Permanently lubricated blower assembly**—heavy-duty, lube-packed, sealed ball bearings in blower and motor eliminate need for periodic lubrication service.
- 5 **Fresh air inlet**—provides for blending of filtered make-up air with return air. Adjustable up to 1/3 of total volume.
- 6 **Conditioned air outlet**—connects directly to a short, pre-insulated combination supply-return duct. There are no transmission losses.



- 7 **Quality Compressor**—operates up to 125°F. outside temperatures. Standard Tecumseh or Copeland, easily serviced or replaced in any section of the country.
- 8 **Oversize Condensing Coil**—the larger area dissipates more heat to provide greater cooling efficiency.

TECHNICAL INFORMATION SERVICE

Detailed information and product specification sheets on the Skyliner may be obtained from your local Janitrol representative or by writing the factory. There's no obligation, so why not bring your files up to date?

JANITROL®

Circle 179 for further information

Architectural & Engineering News

NEW ROOF TOP HEATING-COOLING SYSTEM HAS BROAD COST & COMFORT ADVANTAGES *for single story buildings*



SKYLINER by JANITROL

DOESN'T USE INSIDE SPACE...ELIMINATES DUCT SYSTEM...ALLOWS
REDUCTION IN BUILDING HEIGHT...INSTALLS FAST WITH LESS LABOR

Whether you should specify the Janitrol Skyliner depends on the job, of course. But if the budget is tight, and you're looking for ways to chop costs without penalizing quality, by all means consider the Skyliner.

Shipped completely factory assembled, tested and ready for installation on the roof, the Skyliner "package" provides *really* economical heating, cooling or year 'round conditioning. Conditioned air is circulated through a ceiling diffuser (located beneath the unit) in the conditioned area. No duct system is needed . . . total building height can be reduced. It has an unobtrusive, low silhouette . . . no stack is required . . . flue gas exhauster is furnished. And not a single cubic foot

of usable inside space is used by the Skyliner system!

One or more Skyliner units may be used to provide a simple, efficient zone-controlled comfort system, with each Skyliner controlled by its individual thermostat. A wide range of capacities is offered to match the needs of each zone.

The Skyliner is completely enclosed in a weatherproof, insulated, aluminumized steel cabinet. The unit has been operationally tested in 60 m.p.h. winds and for two hours at 12-inch/hr. rainfall. No water or sewage service, no refrigerant piping or charging and no complicated electrical wiring are required. All important factors in cutting costs and speeding up installation!

Here are Some Points to Remember about the Janitrol Skyliner

Multiple Unit Zone Control Type—You can have an individually sized and controlled unit for each occupancy area. Each unit operates only for its own zone, without standby or transmission losses. Multiple units assure continuity of service, since the shut down of a single unit for service or maintenance will not affect performance of other units.

Low Installed System Cost—A Skyliner packaged system offers substantial savings over a conventional site-fabricated central system by:

- Elimination of equipment room.
- Elimination of duct system.
- Elimination of wiring, assembly, installation and checking of individual system components.
- Elimination of water or sewage service.

Meets or exceeds national standards—All Skyliner units carry the certification seal for capacity and performance according to the rigid standards of the Air-Conditioning and Refrigeration Institute. Components are listed by Underwriters' Laboratory and the American Gas Association.

Leasing Plan to Save Capital Investment—A complete Skyliner system can be leased on a long-term basis. Permits owners to keep their working capital working.



HEATING & AIR CONDITIONING

A DIVISION OF MIDLAND-ROSS CORPORATION, COLUMBUS 16, OHIO
IN CANADA: MOFFATS LTD., TORONTO 15

DOCUMENTS

lowed for use in street sanitary sewers in residential areas and the conditions which should be attached to the use of minimum-size pipe.

Refrigerated Storage Installations, NAS/NRC Publication No. 759. 1960. \$2.00.

Covers design criteria and selection procedures for refrigerated storage installations. The report deals with vapor barriers, insulations, and interior finishes, and their installation. The major part of the data upon which the findings are based was collected in a nationwide inspection and survey of government and private storage facilities by a team of engineers.

British Information Services, 45 Rockefeller Plaza, New York 20, N. Y.

The Strength Properties of Timber, Forest Products Research Bulletin No. 45. 34 pp. 50¢.

This bulletin presents the physical and mechanical properties of 172 homegrown and imported softwoods and hardwoods, determined from tests on small clear specimens. Test procedures and methods are covered. Also discussed is the influence of the more important factors upon the strength of timber.

Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Research Highlights of the National Bureau of Standards, Annual Report 1960, NBS Miscellaneous Publication 237. 189 pp. 65¢

This publication presents in compact, digest form an illustrated account of NBS research and measurement activities in the fiscal year of 1960. Approximately 225 programs in 18 different fields of research and development are described.

Precision Measurement and Calibration, NBS Handbook 77. 1961. Contains three volumes: Vol. I, *Electricity and Electronics*, 845 pp., \$6.00; Vol. II, *Heat and Mechanics*, 965 pp., \$6.75; and Vol. III, *Optics, Metrology, and Radiation*, 1,025 pp., \$7.00.

This handbook is a compilation of the more important NBS publications over a period of years, dealing with precision measurement and the calibration of standards. It is intended to serve as a quick reference.

(Continued on page 102)

Circle 179 for further information

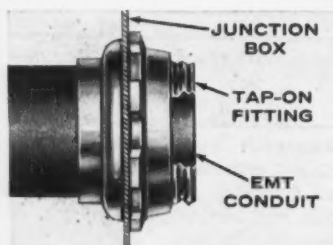
IT'S EASY TO SEE WHY

YOU CAN'T GO WRONG

(When you specify Tomic Tap-on EMT Fittings)

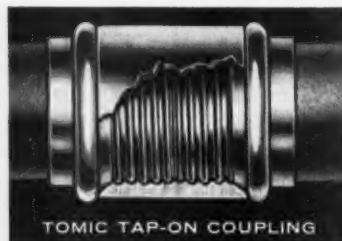
Only Tomic Fittings are specifically designed to provide safe, sure, *permanent* connections with Electrical Metallic Tubing—the kind of connections once possible only with heavy conduit! Tomic Fittings install with minimum effort—do not depend on the strength of the man for tight, strong connections. There's no guesswork, no chance of concealed errors. With Tomic Fittings the job *has to be done right* . . . giving you positive, vibration-proof grounds *every time*.

Tomic Tap-On Fittings feature a patented pre-flex stainless steel locking ring, designed to grip thinwall conduit securely at multiple points providing a positive vibration-proof ground that won't shake, jar or work loose. No tools are required . . .



... just a tap or a push, and fitting becomes an integral part of the thinwall . . . automatically puts standard pipe thread on EMT conduit! Conduit locks flush with edge of fitting for tight, neat connections at junction boxes because Tap-Ons are the only thinwall fitting that permits EMT conduit to actually enter junction box.

And for perfect couplings anywhere in the raceway—long runs, saddles, bends, corners, etc. specify Tomic Tap-On Couplings! Illustrated at left, the complete Tomic Coupling consists of two Tap-On Fittings plus a sleeve. All fittings screw together and permit change in raceways from EMT to rigid, flex, or any type cable without special adaptors.



Tap-On Fittings and Couplings are only two of the many electrical products developed under Tomic's extensive program of research, specialized engineering and nation-wide field testing. For complete details, or a demonstration of Tomic's advanced line of electrical fittings, write:

tomic
TODAY'S FINEST ELECTRICAL FITTINGS

TOMIC SALES & ENGINEERING CO.
20,000 Sherwood Avenue,
Detroit 34, Michigan



Circle 180 for further information

DOCUMENTS

(Continued from page 101)

ence source for workers in the field of standards, and also as a textbook and aid to scientists and engineers in standards laboratories.

X-Ray Protection Up to Three Million Volts, NBS Handbook 76 (supersedes H60). 1961. 52 pp. 25¢

This handbook sets forth standards of safety established by Subcommittee 3 of the National Committee on Radiation Protection and Measurement. It contains data and recommendations pertaining to all persons involved.

Statistical Handbook of Science Education, NSF-60-13, published by the National Science Foundation, 1960. \$5.55.

Presents statistical material on the education and training of scientists and engineers in the United States. Major parts cover: (1) human resources data—population, educational levels of the population, college degrees awarded and qualifications of teachers; (2) institutional and financial data—number and types of schools, expenditures, tuition costs and financial aid; and (3) general appendix tables containing more detailed information on all subjects.

National Mineral Wool Insulation Assn., 1270 Sixth Ave., New York 20, N. Y.

Standard for Mineral Wool Building Insulation. 7 pp. No charge.

This industry standard represents the first standard written for mineral wool building insulation. One of the main purposes is to define the thermal performance categories of homes in terms of both U values and installed resistance units or product designations. It also covers the physical requirements of mineral wool insulation. Tolerances are specified for vapor permeance of facings, dimensions, resistance to mold and decay, thermal performance, and fire resistance. Test methods are included.

Douglas Fir Plywood Assn., 1119 A St., Tacoma 2, Wash.

U. S. Commercial Standard C.S. 45-60 for Douglas Fir Plywood. 20 pp. No charge.

This reprint of the government standard also includes Douglas Fir Plywood Assn. grade-trademarks. This is the first major revision of the commercial standard for Douglas fir plywood since 1955.

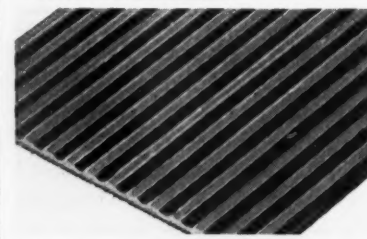
SPECIFY MELFLEX SAFELY

for stairs, landings
hallways and floors



MOLDED RUBBER SAFETY STEP TREADS

Attractive, lasting covering for wood, metal, tile or concrete steps. Six marbled colors (the color goes clear through) or plain black, square or curved nose, full 1/4" thick. Maximum sizes available: 24" deep by 72" wide. And Melflex Diamond Grip Rubber Safety Treads are listed by Underwriters Laboratories—you can specify Melflex with assurance.



RIBBED MEL-ISLE® RUNNERS

Heavy traffic areas need better protection, too. Tough Mel-Isle Runners have deep ribbed design for safer footing . . . wear-resisting rubber for longer life. Supplied in 1/8" or 3/16" thickness, standard 36" width, for varying service and design needs.

Also available: Matching Mel-Flor® smooth flooring in rolls or cut to specifications.

for lasting quality, Melflex pays

MELFLEX PRODUCTS CO., INC.

410 S. Broadway Akron 8, Ohio

Circle 181 for further information

Architectural & Engineering News

ABSTRACTS

EVALUATION OF MATERIALS

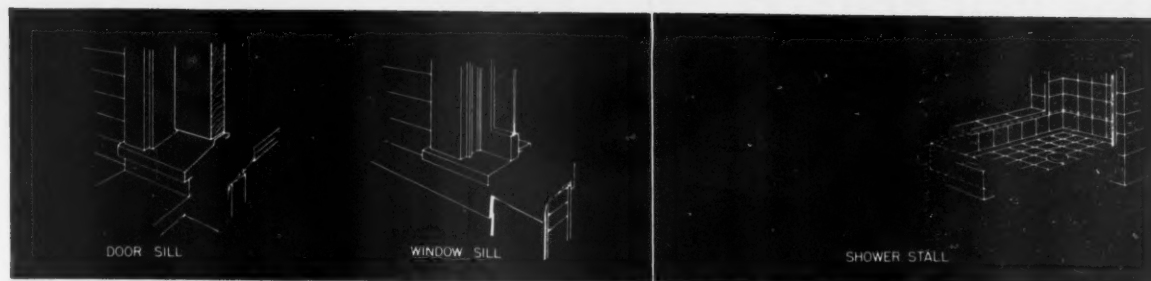
"Problems of procedures and methodology in the evaluation of building materials and structures." From a talk by Morris Kaplan, Technical Director, Consumers Union of the U. S., Inc., delivered at the Building Research Institute Fall Conferences, November, 1960.

"The problems of evaluating building materials are fundamentally no different from those of evaluating other products. During the 25 years CU has been concerned with these problems, it has found that one of the biggest is validated methodology.

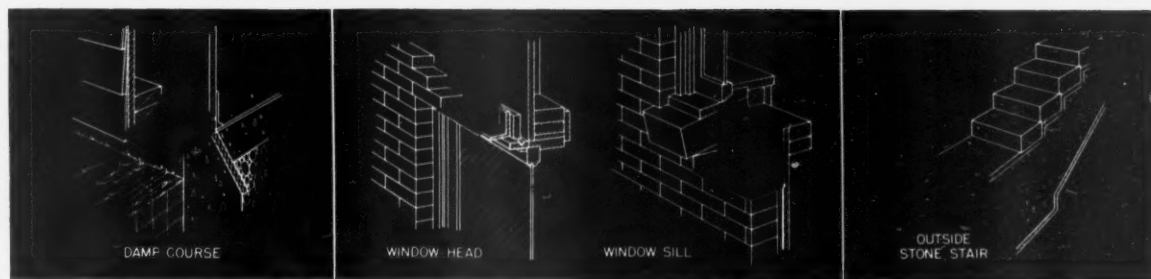
"Historically, when the world was simpler than it is today, products (and services, too) were evaluated by trying. When products remained the same year after year, it was possible by the 'once bitten, twice shy' technique to find the best ones. Furthermore, it was possible for an individual purchaser to know when he had been bitten, and how deeply. Products were relatively simple, the materials of which things were made and the processes used had a long history of experience behind them against which their performance was easy to gauge. You knew what to expect and could tell if you were getting it. Brand names (guild marks) acquired meaning in this way and were reasonably reliable measures of quality.

"With the complications which came after the Industrial Revolution—the proliferation of products, the impersonal character of the producers, the frequent changes in products and the use of new materials and processes—the problem became harder. Accelerated techniques for evaluation were required to keep up with the rapid changes in products and with new untried developments in materials and technology. Testing became important and early 'tests' were based on simplifying assumptions—usually not stated but nevertheless there. A fabric, for example, will 'perform' better if, as delivered, it takes more pounds to pull it apart; or, with greater sophistication, its warp and filling tensile strengths are high; or, with even more sophistication, it will withstand, when new, more passes of an abrasive wheel, etc. What is said of such fabrics is that they are 'stronger' or more 'abrasion resistant' or, even more sweepingly, that

(Continued on page 104)



WINDOW AND DOOR SILLS are vulnerable spots in frame construction. Get lasting protection with flashing products of "Electro-Sheet."



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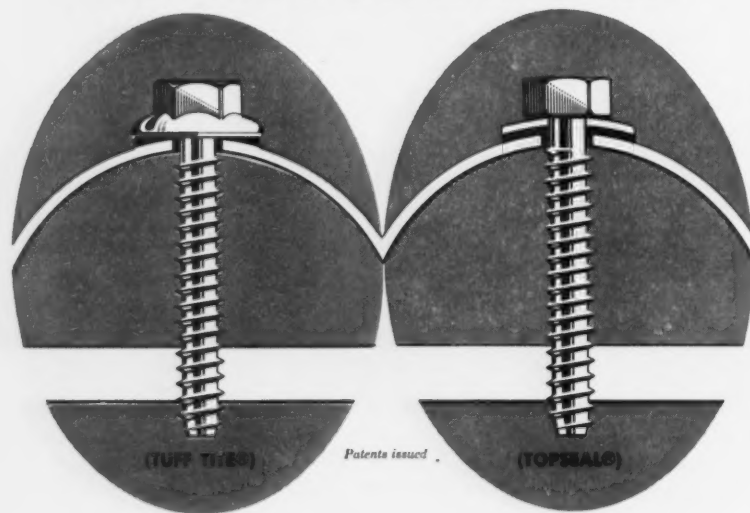
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ABSTRACTS

(Continued from page 103)

they are 'longer wearing' or "more durable." The same kind of extrapolation from 'test results' is made in almost every field—from floor coverings to roofing materials, from water heaters to storm windows.

"A further effort to provide a test which simulates use more closely takes the form of combined tests, e.g., tensile tests after a series of launderings; abrasion cycles followed by tensile or burst tests, etc. Here the attempt is to get away from the assumption that tensile strength, *when new*, is a measure of strength throughout the life of the product. The loss in tensile strength after other simulated uses like laundering, abrasion, flexing, etc. is taken as a better measure of performance in use. . . .

"In recent years, the 'field service trial' type of test has come into its own. In these tests an attempt is made to subject the product to actual use conditions or to as close an approximation of such conditions as possible, but to *accelerate* the use. Railroad stations, department store elevators, gasoline service stations, hotel lobbies, Disneyland exhibits, the Staten Island ferry, the Moscow Fair, have all been used to evaluate carpet performance by having *people*, not laboratory machines, walk over the test carpets. The carpets are vacuum cleaned and washed or dry cleaned at intervals and examined for appearance, color retention, soiling, height of pile, wear in spots, etc.

"Putting aside the misuse of such methods as advertising gimmicks, even when the test is carefully considered as an effort to get the facts, the performance of the product in real life often does not gibe with the estimate of performance drawn from the field service trial. Unfortunately, in much of the testing that is done the simulation isn't close enough or the degree of correlation between the test and the real life use result is not known.

"I do not mean to denigrate the importance of all the testing that is done. Much of it is directly to the point. The particular use condition can often be simulated quite accurately. Validation of many test procedures has been studied and good correlation *has* been established in many instances. For example, shock hazard can be accurately measured in an electrical product, thanks to the work of Dalziel. Per-

formance tests for some gas equipment and some air conditioning equipment have been carefully worked out by the trade associations involved. Stoll worked out a formula for integrating three kinds of abrasion (flat, edge, and flex abrasion) as determined on an instrument he designed, into a single measure of the durability of Army fatigues of a particular type. The degree of objectionableness of 'wow' in a record player can be measured on an instrument in a laboratory, etc. The development of statistical techniques has made possible a great reduction in the very costly field-service-trial type of use test with a concomitant increase in its accuracy. Well-designed use tests have also made possible the isolation of the factors affecting performance so that simple, valid laboratory tests could be developed.

"Withal, one of the major problems in product evaluation is in this area of methodology. There are too few methods of any kind, validated or not, and too many that are used with blind faith and without validation. [All of this assumes an interest in the evaluation of a product. A problem on a different level, not to be discussed here, is that too often, neither the producer of the product nor its purchaser has any interest in its proper evaluation. On the producer's side, an advertising campaign, high powered persuaders, and other selling techniques sometimes take the place of quality competition. On the buyer's part, hearsay, gimmicks, an attractive price take the place of a considered, rounded, well thought through evaluation.] . . .

"Where can we look for developments which will improve this situation? Individual producers? Industry associations? Individual consumers? Associations of consumers? Cooperative research by all groups? University research? Government? In a sporadic way, all of these groups have at one time or another made efforts in this direction—some quite successfully. But taking all the factors into consideration — commercial interest and bias, costliness of such research, the feeling that 'fundamental research' is not involved in such studies—I believe the most likely place to look for such research is in the cooperative efforts of a whole industry, in the cooperative efforts of many consumers and in the government. And of these, the last appears to me to be the most desirable.

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Circle 184 for further information

April 1961

ABSTRACTS

"One of the most wasteful aspects of our economy is the production and sale of clearly inferior products. Our precious natural resources have valuable labor expended on them to produce any kind of a product, good or bad. How much better for our nation (and the world), in satisfactions provided and in effective, non-wasteful use of materials and labor if the product is good rather than bad. No honest manufacturer can be hurt by providing him (and his competitors) with a properly calibrated yardstick against which he (and the consumer) can measure the 'quality' of his output. In many respects the development of good methods for the evaluation of a product is similar to the development of standards of length, mass and time, which is now the function of the National Bureau of Standards. It has not been left to the good intentions of manufacturers and consumers to establish the methods by which length or weight or temperature or time should be measured. Why? Because the biases of each side might prevent agreement, and an arbiter is needed; and because the costs are high for doing the job with the required degree of competence in this highly technical age in which we live. Why not apply the same considerations, then, to methods of measuring performance or durability or safety or economy of a product? Why should not the National Bureau of Standards, with its great understanding of measuring problems, of materials, of technology and of testing techniques undertake, as representatives of us all, producer and consumer alike, to develop and publish methods of product evaluation for anyone to use in the best interest of the whole country?"

"While many Bureau people do participate in the work of ASTM, ASA, AATCC and other organizations which concern themselves with standards and test methods, the test methods these organizations work on generally apply to *materials*, not ultimate consumer goods. And it is in the methodology of evaluating ultimate consumer goods that the major problems exist for most of us. Improving the method for determining the tensile strength of a bar of plastic may be a worthy endeavor. But it does not necessarily tell us how to determine which of several plastic members will be best for a par-

(Continued on page 106)

A use of Security Panel which is growing in popularity with architects is shown at the right. It is often specified as a guard on stairways in schools and plants; thus it serves its double purpose as a protective barrier and as decoration.

The lobby of a large Miami hotel has a false ceiling of Security Panel. The panels not only diffuse the light evenly throughout the lobby, but also give the ceiling an attractive, distinctive appearance.



The striking beauty of Security Panel is shown in its use as glazing material in this church. Architects specified the distinctive Resolite Panels for the side windows of the church (below).



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A Functional and Decorative Building Material

This flat sheet—a combination of polyester resin translucent panels and expanded metal—provides the designer with a material that possesses high dimensional stability and high impact strength. Architects have found "Security Panel" desirable as cover, separation, decoration or protection, and in applications which combine two or more of these functions.

In addition, "Security Panel" is manufactured in a variety of sizes and colors. For complete information write today for our new booklet on RESOLITE Security Panel.

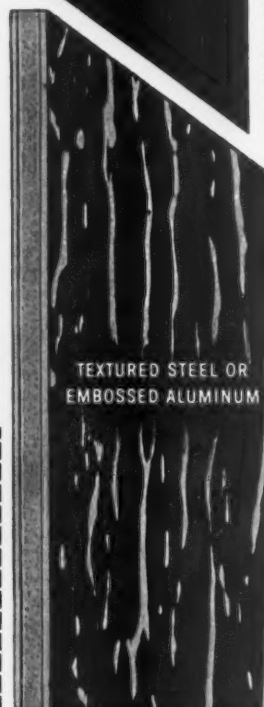
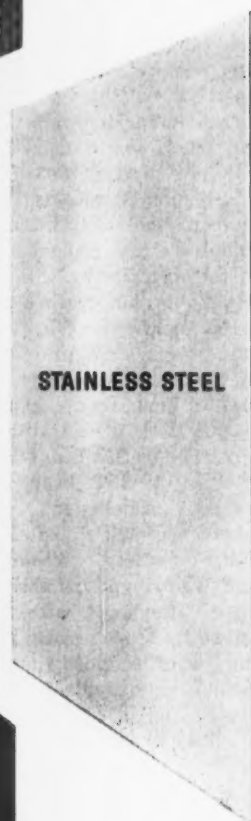
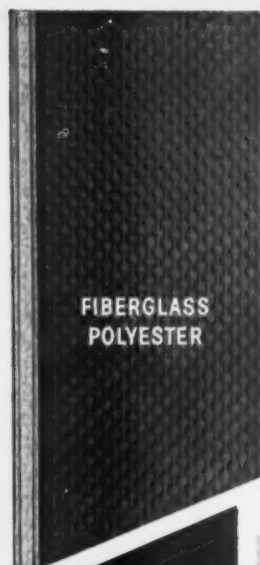
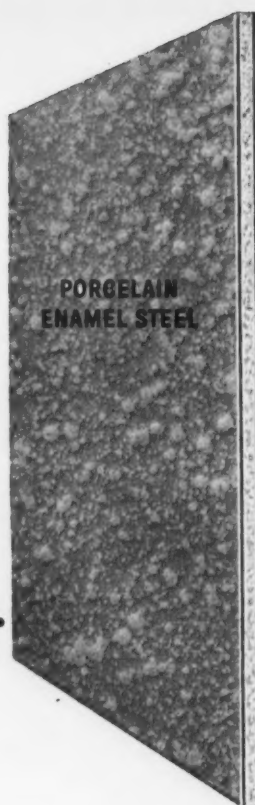


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cores
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to meet
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ABSTRACTS

(Continued from page 105)

ticular building use.

"It may interest you to know that even as recently as 15 years ago the Bureau did concern itself with ultimate consumer goods methodology. In 1944 H. F. Schiefer and his co-workers studied household blankets and developed minimum performance specifications, complete with methodology. Earlier, there was a study on the wear testing of carpets by Schiefer which was an important effort to correlate laboratory and field service tests. . . .

"The need for such work is even greater today.

"Perhaps, in addition, some university people would find this work challenging. It is a field in which the ground is barely broken. It cuts across many disciplines; it could challenge the imagination of architects, engineers, psychologists, statisticians, chemists, physicists, etc. It should produce support not only from the university, but from foundations, from government (which does a lot of purchasing and could use such information), from industry and labor groups and even—as the consumer movement grows—from consumer groups.

"Another approach should be through the existing organizations concerned with test methods. Twenty-five years ago the ASA set up an 'Advisory Committee on Ultimate Consumer Goods.' Fifteen years ago, the ASTM set up a comparable committee. Considering the time which has elapsed since their inception, these committees have been relatively inactive. Since these organizations depend on initiative from their members, and since most of their members are industry people, this suggestion is really addressed to industry groups. Through a joint effort of the members of an industry and with the supporting effort of consumer groups, using the machinery of ASTM, ASA, AATCC, NEMA, etc. an important stride can be made in the direction of end use evaluation procedures.

"And while we are dreaming of this millennium, perhaps we can also make out dimly a Consumers Union for the Building Industry—an independent, unbiased, subscription-supported agency, carrying no advertising, whose sole interest and support lies in the consumer of building materials. Competent, unbiased, total end use evaluations of building products and materials published for all to see and use."

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Hendrick Mitco grating is "quality manufactured" by forcing rectangular square-edged bars into integral panels under hundreds of tons of hydraulic pressure. The resulting cold flow of expanding metal locks the transverse bars and cross bars together in the form of an indestructible "internal rivet." Hendrick Mitco is available in like designs in steel, stainless steel, aluminum and magnesium. For applications where economy is a factor, Hendrick welded grating is also available.



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Circle 187 for further information
April 1961

DIGEST: 28

FOAMED METALS

*From an address by Dr. Johan Bjorksten, President,
Bjorksten Research Laboratories, Madison, Wis., delivered before the
1960 Fall Conferences of The Building Research Institute.*

The use of metals in solid form is very old. The intrinsic properties of metals, their strength, hardness, wear resistance, and many other properties have met requirements imposed by the broad field of engineering technology. However, their densities are, with few exceptions, comparatively high and therefore the problem of combining the advantages of a metal with light weight becomes important. This is evidenced by the interest in honeycomb and other cellular metal assemblies made by brazing or welding techniques.

The patent literature (U.S. 2,434,775: Jan. 30, 1948, and 2,553,016: May 15, 1951) describes a foam-like metal made by heating a base metal under pressure with a second gas-forming material to a temperature above the melting point of the base metal and then releasing the pressure to cause the gas-forming material to decompose. The base metal solidifies into a foamed structure.

It may not be surprising that a laboratory with a broad experience in foaming plastics should see the possibilities of applying the techniques of dealing with low melting organic compounds to the problem of foaming metals and should exploit the concept. This has been the contribution of the Bjorksten Research Laboratories to a completely new field of metallurgy. The basic technology has been developed and has been described in the literature and in patents and patent applications.

Most of the work has been on aluminum and its alloys. This is a light metal; the melting point is low; it has good mechanical properties; it is comparatively cheap and it can be comparatively easily handled in the liquid state. Another consideration is that foaming agents, the gas-producing materials, can be introduced at atmospheric pressure and the foaming reaction also proceeds at atmospheric pressure. Accordingly, work to date has dealt chiefly with aluminum and its alloys, having in mind, however, the foaming of other heavier high melting metals, such as copper and iron. These foams have been produced on a laboratory scale but the emphasis on the aluminum systems has resulted in a technology that is ripe for commercial development.

Basically the procedure for producing a foamed aluminum body comprises adding a foaming agent to a pool of molten aluminum, mixing thoroughly, and pouring into a mold. It should be stated that a pilot plant has produced foam by a continuous process. Full development of such a continuous casting operation only awaits more complete engineering studies. The basic principles have been established.

A large number of process variables can be employed to produce difference in the foamed metal. The composition of the metal, whether pure aluminum or an alloy, the operating temperatures, the type and amount of foaming agent, the mixing operation, the type of mold, whether heated or cold metal, ceramic or sand; all are controllable variables that contribute to the versatility of the operation.

Foam can be produced from pure aluminum but for many operations the aluminum-magnesium alloys in the 7 to 10 per cent magnesium range are preferred. The 10 per cent alloy has a liquidus-solidus range of 1122° to 968° F in which the plasticity contributes to stability of the foam. Since surface tension is a factor in controlling bubble size and foam stability, the effects of minor constituents, such as oxygen, accidentally or intentionally introduced, can be important.

The foaming agent obviously must not introduce harmful elements into the metal and so affect its mechanical and physical properties. It should possess chemical and thermal stability, so that it can be handled and stored safely. Its thermal stability should allow complete dispersion in molten metal without undergoing much premature decomposition and yet it should decompose completely when the mix is poured into the mold. The volume of gas evolved per unit weight should be large. A number of possible foaming agents are known; those presently preferred are the hydrides of zirconium or titanium. The amounts required are small, being of the order of 0.5 per cent by weight. Obviously the density of a foam depends on the amount of foaming agent used.

The density of the foamed metal and the structure of the foam are of primary interest in its use as an engineering material. One determining factor that controls these properties is the type of mold. Obviously metal, chilled rapidly by contact with a cold, heavy metal plate, will have little opportunity to produce a foam and an essentially solid casting will be formed. However, as the rate of chill is reduced, either by heating the metal mold or by substituting a material with lower thermal conductivity, such as sand or a ceramic, the solid wall formed in contact with the mold wall becomes thinner and a lower density casting is produced. The ratio of porous structure to solid wall is increased.

An interesting and important characteristic of foaming metal lies in its expansion. In the simplest operation, the metal is poured into the bottom of the mold, and, as foaming takes place, the metal rises. In a casting with a 2" cross section a rise of 8 feet has been observed. The density of the foam in the casting, measured in sections taken from top to bottom, is essentially constant. Another consideration inherent in this expansion is that a complicated mold will be filled. The exact foaming pressures have not been measured but they are known to be high.

The size of the bubbles forming the foam and their structures, whether isolated or connected, an open foam, are subject to operational control.

The uses of a material and, especially, of a structural material are based on several factors among which are availability and cost, workability, mechanical and physical properties, fire resistance, and performance in terms of resistance to corrosion and weathering and to rot and other types of biological decay.

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DIGEST: 28

There will be no shortage of raw materials. The aluminum and magnesium industries are well established. Even the most optimistic projections of uses for foamed aluminum show that the productive capacity of the industry in both primary and secondary metal can meet the demands, although a welcome expansion of the aluminum market will result. The availability of foamed aluminum depends primarily on the growth of the industry itself. Since the major item in the cost of foamed metal is the base metal, costs are to a large degree fixed by the raw material, the metal itself.

The workability is good; it can be cast into thin sections, $\frac{1}{2}$ ", and into large dimensions without warpage. The accuracy of the casting is limited only by the closeness of dimensions of the mold. The surface may be a plane, or if so desired a design can be cast into the surface. The casting can be dressed by sanding or other conventional means. A casting can be cut on a band saw or with a hand saw. Assemblies can be made by nails, screws, bolts and by welding.

The strength is dependent upon the inherent properties of the alloy used. The data given are those of the 7 per cent magnesium alloy.

Density/lbs./ft ³	Transverse Rupture-2" wide-1" thick-12" span
15	110 lbs.
20	180 lbs.
25	240 lbs.
30	280 lbs.

The mechanical strength as measured by transverse rupture of a 2" wide test piece, supported on a 12" span is approximately proportional to density. It should be mentioned that there is no directionality of physical properties. The K Factor for foamed aluminum is reported as follows:

Density/lbs./ft ³ /temperature	K Factor
11.24 75°	3.1
18.18 "	3.65
27.17 "	4.7

The density of foamed aluminum may be varied by suitable processing from about 10 per cent of that of pure aluminum to values approaching that of solid metal. Comparison with common wood is interesting.

Wood	Density — lbs./ft ³
Balsa	7.5 to 12.5
Ash	33.
Cypress	30.
Douglas Fir	26.
Sugar Maple	42.
White Oak	44.
Walnut	35.

These densities, excepting that of the lower density balsa, can be duplicated in foamed aluminum.

The use of aluminum and its alloys under conditions where resistance to corrosion is important does not need elaboration. The composition of the foamed metal is essentially that of the parent metal and any statement made about the latter will apply to the former.

The physical structure and insulating properties of the material make it remarkably flame-proof. An oxy-acetylene flame, directed onto the surface of a 1" thick panel, caused only localized melting and oxidation. The porous structure limits conductance of heat into the mass of metal.

Its nonsparking characteristic may be the basis for specialized uses.

With these properties in mind, potential uses can be envisioned. Those mentioned will be typical and do not cover all suggestions.

One of the obvious uses that can be considered is in wall

panels $\frac{1}{2}$ " and thicker in a standard 4' x 8' size and larger as the technology progresses. Such panels, the first product of a pilot plant, can find use in both interior and exterior construction. The fact that panels may be cast with a plane surface or with a design offer possibilities in architectural planning. The inherent resistance of aluminum and its alloys to atmospheric corrosion and to rot can be exploited. This use is obvious and needs no elaboration.

The fire resistant properties suggest use in marine construction for bulkheads and the like. The strength and lightness can be used to advantage in roof decking and in the side walls of trailers, box cars, etc.

An interesting application is as the core of a laminated door. All householders have experienced the warpage of outside doors which shrink on the inside and swell on the outside. One can envision a composite, a foamed aluminum core, covered with wood or plastic that would be no heavier than the conventional construction and that would be warp-free.

This concept may also be used in the construction of small boats, particularly in the decking and transoms. When fabricated of wood and fiberglass there are problems of forming a composite wood structure into arched or curved shapes. The foamed aluminum can be cast accurately into a required shape and then covered with fiberglass or another finishing surface. The absence of moisture in foamed metal eliminates the possibility of bubble formation when the fiberglass is applied. Another point for consideration lies in the elimination of swelling and warping that may be caused by moisture penetrating accidental holes in the fiberglass.

A specialty use in the printing industry is suggested. A "back-up plate," a piece of hard wood such as cherry, is used in the printing of pictures to position the surface of the picture in the same plane as the type. The variation in thickness in the wood plate occasioned by changes in humidity suggests use of a material of constant dimensions; a condition that is met by foamed aluminum.

Foamed aluminum panels may be used as open tank storage covers to control evaporation and fire hazards present in such materials as petroleum. Low densities can be produced that will provide a floating cover.

Furniture, particularly lawn furniture, can be made. Chairs, benches, tables will be light and weather-proof.

The architectural uses are perhaps chiefly limited by the imagination of designers. Decorative panels can be cast; the material may be anodized for color effects; it can be used for decorative fireproof ceilings; one skin surface can be removed to expose the cellular structure which has an inherent decorative value.

There are many other uses. The metal casting industry can find uses in metal molds and patterns. Shipping boxes and containers for fragile equipment are potential applications, because of the shock absorption property.

The usefulness of a material must be judged by many criteria which can be briefly summed up in two questions. First, is it competitive in cost with the traditional materials? Second, is its performance equal or superior? If the answer to these is affirmative, the material has a place in commerce. There is also a third consideration that can be of major importance. Does it possess a property, or combination of properties, that can be applied to completely new uses? An old but good example of this is the use of glass for windows to admit light but exclude the vagaries of weather. The development of a new use presents interesting challenges to the imagination in the devising of new things that can be done; new because no material was hitherto available.

BOOKS

Capital Requirements for Urban Development and Renewal

by John W. Dyckman and Reginald R. Isaacs. New York: McGraw-Hill Book Co., Inc., 1960. 324 pages. \$11.50.

by J. R. Woodruff*

This, the latest volume in the ACTION Series on Housing and Community Development, is awe-inspiring in the mass and breadth of scholarship and research displayed by the authors who are, respectively, associate Professor of City Planning at the University of Pennsylvania (Dyckman) and Chairman of the Department of City and Regional Planning at Harvard (Isaacs). The book undertakes to present "a thorough study of the national cost of renewal and development . . . the national funds available for these purposes . . . the difficult choices we as a people will face if we elect the staggering task of replacing all of our obsolete urban capital while providing adequate capital for new growth."

This of course is a most difficult and ambitious job for one book to tackle, and the authors' success in grasping their hydra-headed subject is remarkable. Every facet of the problem of redevelopment financing as it presently exists in the United States is closely and carefully examined in reasoned and specific argument, and nothing relevant to the question escapes attention. The Appendix, almost one hundred pages closely filled with details, methods, cost estimates, techniques, etc. is encyclopedic and worth the price of the book by itself.

The authors reach the encouraging conclusion that complete development and renewal on a national scale is possible given appropriate public and private investment, but the reader will perhaps find himself with reservations about the willingness of the community to bear the massive cost envisioned. And there are indeed reasons to question whether development and renewal need be as expensive as the authors foresee. For they have prepared all their cost forecasts upon the basis of a certain middle-sized city on the Northeast of the U. S., known for the purposes of the study as "Case City." However there are cheaper and more expeditious ways to redevelop urban areas than are presently being used anywhere

* Mr. Woodruff is associated with the New Haven City Plan Commission.

in this country, "Case City" included, and it was surely within the province of this book to discuss them. For example, the New Town concept by which speculative land prices surrounding existing urban centers may be avoided; or the principle of pooling and re-parceling plots on a co-operative basis, so widely used in Germany and France since the war (and made legal in New York State for the redevelopment of slum areas under a 1941 statute), by which the cost of land acquisition within existing urban centers can be cut to a fraction of present costs. There is really no more extravagant way to redevelop than our present pattern of buying up expensive urban land with public funds, pooling this land (which makes it more valuable again), then subsidizing its sale to a developer. An acknowledgment of financial and administrative difficulties inherent within the present urban renewal programs in this country, and a look at techniques developed in other countries, would have enriched the book considerably.

However, though it does not attempt a radical solution nor consider concepts of "value-for-money" in capital spending, within the terms it has set itself the book is splendid, and may be well recommended for both reference and systematic study.

Survey of the Law of Building Codes prepared by Charles S. Rhyme. Washington: National Assn. of Home Builders, 1960. \$2.00.

Prepared jointly with the American Institute of Architects, this book provides an informative and excellent study of the background and basis for building regulations. It discusses the legal authority for the establishment of building regulations by local governments and the effect of this on the authority of building officials.

Decorative Cast Ironwork in Great Britain by Raymond Lister. London: G. Bell & Sons, 1960. Illus. 35 shillings (about \$5.00).

Readers will find here a rich and fascinating store of information about the work of a trade that has contributed to the background of history. It is illustrated with many line drawings by the author and about 24 pages of photographs.

The Ten Books on Architecture by Vitruvius. New York: Dover Publications, Inc., 1960. \$2.00.

This paper back edition is the standard English translation, prepared by Professor Morris Hicky Morgan of Harvard University. For the contemporary reader, this classic treatise

(Continued on page 110)

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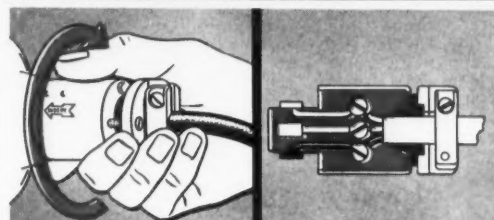
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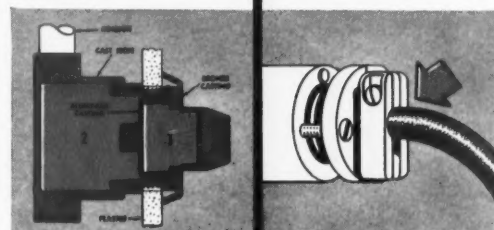
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BOOKS

(Continued from page 109)

provides insights into the living conditions of Greece and Rome. Vitruvius' conception of the broad function of architecture, concerned as much with the creation of suitable living space as with the mechanics of construction, is very close to our own.

Guide to Design Criteria for Metal Compression Members. Ann Arbor, Mich.: Column Research Council, 1960. 93 pp. \$5.00.

This covers a summary of design criteria based upon recent as well as past research on metal compression members in buildings and bridges. It includes such subjects as: centrally loaded columns, compression member details, laterally unsupported beams, and beam columns.

Hydrometry, Theory and Practice of Hydraulic Measurements by Prof. A. T. Trokolanski. New York: Pergamon Press, Inc., 1960. 684 pp., illus. \$18.00.

The English edition of *Hydrometry* in comparison with the third volume of *Hydromechanika techniczna* (Applied Hydromechanics), is revised and enlarged to include the considerable progress in the theoretical foundations, design and application of hydrometric instruments, which has appeared since the publication of the Polish edition. Special reference is made to recent advances in British instrument design and production.

Introduction to Petroleum Chemicals edited by H. M. E. Steiner, Ph. D. New York: Pergamon Press, Inc., 1961. 208 pp., illus. \$8.00.

This volume contains the proceedings of a meeting organized by the Manchester College of Science and Technology. In this book are surveyed important aspects of the petroleum chemicals industry at its present level of development.

Engineering Manufacturing Methods, Second Edition, by Gilbert S. Schaller. New York: McGraw-Hill Book Co., Inc., 1959. 682 pp., illus. \$9.50.

This new edition is a thorough revision which includes information throughout on recent advances in materials, techniques, equipment, and theories. The book is a broad introductory survey of manufacturing methods, divided into sections on: (1) materials; (2) foundry techniques; (3) shaping and treating; (4) machining; and (5) welding. Photographs, diagrams, tables, survey questions and references included.

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Petroleum Products Handbook, First Edition, by Virgil B. Guthrie, Editor. New York: McGraw-Hill Book Co., Inc. Various paging. \$18.50.

A compilation by 32 specialists of practical information on all commercially important petroleum products. Arrangement of contents is that of the regular engineering handbook, and style is uniformly clear and readable. Articles on individual products give properties and performance; describe manufacture, transportation, storage, applications, and economics; and refer to, or give essentials of, specifications. Numerous diagrams; lengthy bibliographies.

Advanced Engineering Mathematics, Second Edition, by C. R. Wylie, Jr. New York: McGraw-Hill Book Co., Inc., 1960. 696 pp. \$9.00.

Discussing those branches of mathematics of most current interest and importance to engineers and physicists, this completely rewritten, rearranged, and revised text assumes only a good background in calculus as prerequisite to understanding its detailed, clear, and precise presentation. New to this edition are materials on determinants, finite differences, linear difference equations, and Laplace transform theory, as well as many other timely topics.

Electromagnetism and Relativity; With Particular Reference to Moving Media and Electromagnetic Induction, Second Edition, E. G. Cullwick. New York: Longmans, Green & Co., Inc., 1959. 291 pp. \$12.50.

For advanced students and teachers of physics and electrical engineering. Knowledge of basic electromagnetic theory and of vector analysis is assumed, but relativity theory is developed in the text. Treatment is from a physical viewpoint stressing the fundamentals of electromagnetic physics within the framework of relativity and including a thorough examination of the theory of electromagnetic induction.

Metallic Corrosion Inhibitors by I. N. Putilova, S. A. Balezin and V. P. Barannik, translated by G. Ryback. New York: Pergamon Press, Inc., 1960. 196 pp. illus., \$10.00.

This monograph reviews the theoretical and practical aspects of the application of corrosion inhibitors. It deals with the classification of inhibitors and their characteristics when added singly or as mixtures to



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NAMES

There is an aura of no-nonsense about Edmund Bacon, an impression caused not so much by his outlook upon the world, which is clearly reasonable, as by his expression of this reasonableness, which is quite manifestly blunt. One knows soon enough, and without any ifs or buts, where he stands. To anybody implying that the successful rebuilding of Philadelphia is due politically to Democratic Mayors Clark and Dilworth, he will say yes *but*—and the but will reveal his distaste for black-and-white thinking—a lot of groundwork was laid under the Republicans. You cannot obtain action *solely* by getting the people on your side—how could anyone think this, let alone ascribe such thinking to him. On the other hand action is not to be had merely by making a good case at City Hall and Chestnut Street and then sitting back to await results. Thirdly, the Idea, the New Approach, will die on the vine unless championed by the second element (the Leaders) and accepted by the first element (the People). Interaction is the key.

Edmund Bacon, a latter-day Baron Haussmann—and there are those who did indeed raise him to a mythical peerage as Lord Bacon—could have used, it comes to mind, a stick such as that made available so conveniently by the Emperor Napoleon. It would have made things that much easier. But this is the age of the carrot, so to speak, and it is just as well, for authoritarianism is not a part of Bacon's credo. If a neighborhood is to be razed and reraised, let us not prepare a plan and then go to the inhabitants and say to them: "Here is the plan. It has been well thought out. In relocating, you will be given every assistance." On the other hand, Bacon thinks it is foolish to let the planning be done at the inhabitants' level: we shall get no more than a scheme for a new street lighting system. Let us do both; let us be prudent; let us not dismiss lightly the people's attachment to their neighborhood; but by all means let us be professional in our solution.

Educating the people may not win the campaign, but it will surely win a lot of battles. An important part of the groundwork for later successes was laid by the popularity of the Greater Philadelphia Exhibition, of which Bacon was a designer. Following hard upon the Second World War, it came at a time when citizens were ready to be convinced. The Exhibition presented the Idea. Bacon has personified the Idea. But the third apex of the triangle was still missing when Bacon was made Executive Director of the City Planning Commission in 1949. It was not until 1952 that the city government changed hands, from an administration that had grown

lax from long years in power to one which actively promoted the new Idea. It took another two years before the investors, the *sine qua non* of successful urban redevelopment, were convinced of the soundness of Penn Center, the key project, the test case in many ways, of the whole Philadelphia plan. Throughout, Bacon stuck to his guns. Mayor Clark having become a champion of the plan, it remained for the Pennsylvania Railroad, owner of the property, to proceed to rebuild according to a plan, rather than to allow individual operators to develop it piecemeal. Finally, at a crucial stage, after a New York builder had been persuaded to modify his plans to conform to the total scheme, local builders and bankers joined in the project with enthusiasm. The show was on the road.

Bacon, who is 50, was born in Philadelphia. He is tall, thin, with a certain physical resemblance to T. S. Eliot. He studied architecture at Cornell and after graduation traveled in Europe. He then spent a year in China, claiming that the urban plan of Peking has had a very great influence on his thinking. The Peking plan is noted for the subtle modulation of its vistas and the use of water as a planning element. From 1937 to 1939 Bacon was supervisor of City Planning for Flint, Michigan. From 1940 to 1943 he was managing director of the Philadelphia Housing Association, secretary of the Philadelphia Committee on the 1941 National Planning Conference, and secretary of the National Association of Housing Officials' Post-War Housing Committee. After Navy service in the Pacific, he returned to Philadelphia, was a designer of the Greater Philadelphia Exhibition, and served as senior land planner and chief of the land planning division on the City Planning Commission. In 1949 he became its Executive Director, his present post.

Two years ago Bacon was named Professional Adviser to the FDR Memorial Competition. Reaction of the people to new ideas is obviously highly germane to Bacon's job, and he is inclined to muse over the Chicago Tribune Tower Competition 40 years ago and relate it to the outcome of the FDR Memorial. The winning design of the first was ten years behind the popular thinking of the day. The Gropius project, an also-ran according to the jury of that day, was at least as many years ahead of it.

As for the 1959 competition, Bacon admits readily that the winning design is at least ten years ahead of the average person's ability to recognize its worth. But is the people's preference necessarily a measure of artistic excellence?

Who knows? To reply is to oversimplify, and oversimplification is the one thing guaranteed to make Edmund Bacon twinge.

SAK

EDITORIAL

THE NEW ARCHITECT. A press release crossed our desk the other day. It came, as we recall, from a manufacturer of laminated wallboard, and ran like this: "Ever since a caveman piled stones one atop another to provide a shelter of sorts, building methods have continually improved."

We were taken aback by this statement, because it seemed such an extraordinarily mild way of putting it. Here, after all, we have buildings hundreds of feet high and enclosed with panes of glass big as a man's front yard. We can lift an air-conditioner the size of a tank above the house tops, or build a bank vault five stories below the ground. We spend each year the price of a fair sized ocean liner on research. Our steel becomes stronger, our masonry more versatile, our curtain walls thinner, our ceilings more integrated. We are offered tougher floors, more convertible partitions, more tenacious doors. We can take the top of a table and gouge it, burn it, attack it with a chisel, pour acid over it and in general subject it to a merciless battering, and we won't have a scratch to show for our pains. We enjoy more plentiful foot candles, more beneficial air, superior plumbing, less noise and better hearing. We come upon new glues and new sealants, new fixtures and new hardware.

And that is not all: as each new item makes its appearance, it is backed by a wealth of supporting literature.

How placid in comparison were former days on the architectural scene. Take Jean du Mouton, master mason, in the year of grace 1200. All he needed was a good horse to take him to the quarry at Caen, and an eye for a nice block of sandstone. This, coupled with a knack for hiring a good man with a chisel, and his own good background in the construction of vaults, was about as far as he had to go to keep up with current developments.

Even quite recently, an architect was able to design a building and obtain, by and large, any effects he wished. If some item of structure or decoration did not exist, it could be procured, and on a small run, too. To-day, in economies less advanced than ours, where machines are dear and labor cheap, an architect can still design his building to the smallest detail, certain in the knowledge that what he wants can be made without sending his client to the workhouse. The building bears his imprint; it is his own work; he is totally the master.

But in our own economy, the architect's position as the Compleat Creator is gradually changing character as product manufacturers step up their research and engineers devise new systems and new techniques. The architect is progressively less in control at the source. He now selects where he used to create. He builds from blocks, where he used to create the blocks themselves.

Producers, to be sure, have an ear to the ground for the sound of architects' preferences. But now all kinds of additional design elements present themselves, such as industrial problems of production and financing and marketing, all alien to traditional architectural concepts, but characteristic of our age. The initiative at the primary level, the level of component design, is passing over to the producer.

What Gropius spoke about in the 1920's is coming to pass, Architecture and the machine are inextricably joined. We must acknowledge this fact, for it is incontrovertible. The survival of architecture as a profession depends upon it.

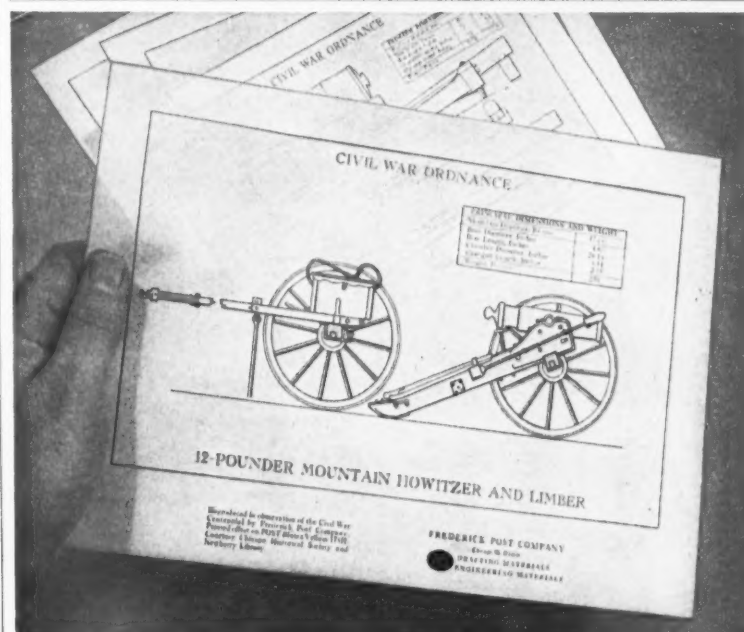
It imposes upon the architect a twofold obligation:

- 1 The obligation to be informed about current technical progress,
- 2 The obligation to think about his role along entirely new lines, lines dictated by the facts of modern economic life.

We feel that this topic is of particular interest to all our readers, and we shall return to it during the months ahead, in order to examine its many facets and explore its implications.

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- 18-20** THE 1961 CONFERENCE ON CHURCH ARCHITECTURE: conference and exhibit, Penn-Sheraton Hotel, Philadelphia, Pa.
- 10-29** ANNUAL BIRCH BURDETTE LONG EXHIBITION: exhibition of architectural renderings, Architectural League, New York City.
- 24-28** AMERICAN INSTITUTE OF ARCHITECTS: annual convention, Bellevue Stratford Hotel, Philadelphia, Pa.
- 30-3** AIR-CONDITIONING AND REFRIGERATION INSTITUTE: board and annual meeting, The Homestead, Hot Springs, Va.
- MAY 1** HOMAGE TO THE GREAT MAKERS: dinner honoring Dr. Gropius, Dr. Mies van der Rohe and Dr. Corbusier under the joint sponsorship of New York Chapter, AIA, Architectural League, and Columbia Architectural Alumni Assn.
- 1-15** EXHIBITION OF MURAL PAINTING: arranged with the cooperation of the American Society of Mural Painters, Architectural League, New York City.
- 16-18** BUILDING RESEARCH INSTITUTE: spring conferences, Shoreham Hotel, Washington, D. C.
- 17-21** ROYAL ARCHITECTURAL INSTITUTE OF CANADA: 54th annual assembly, Chateau Frontenac Hotel, Quebec City, Canada.
- 22-25** DESIGN ENGINEERING SHOW: exposition and conference, Cobo Hall, Detroit, Mich.
- JUNE 25-30** AMERICAN SOCIETY OF TESTING MATERIALS: national meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.
- 26-28** AMERICAN SOCIETY OF REFRIGERATING ENGINEERS: annual meeting, Denver, Colo.
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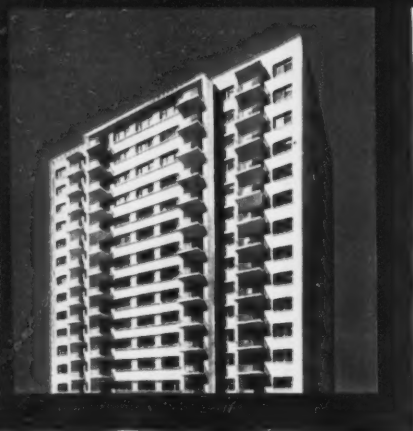
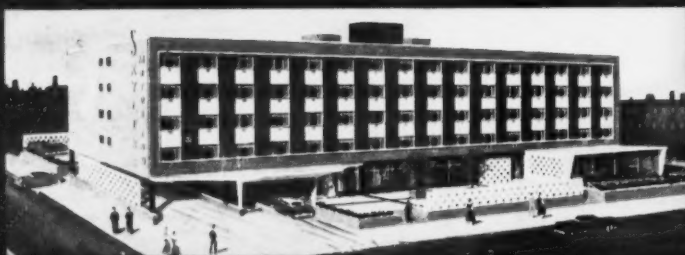
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